

Natural Sciences Grade 4

By:
Siyavula Uploaders

Natural Sciences Grade 4

By:

Siyavula Uploaders

Online:

< <http://cnx.org/content/col11096/1.1/> >

C O N N E X I O N S

Rice University, Houston, Texas

This selection and arrangement of content as a collection is copyrighted by Siyavula Uploaders. It is licensed under the Creative Commons Attribution 3.0 license (<http://creativecommons.org/licenses/by/3.0/>).

Collection structure revised: September 18, 2009

PDF generated: February 6, 2011

For copyright and attribution information for the modules contained in this collection, see p. 195.

Table of Contents

1 Term 1

| | | |
|------|--|----|
| 1.1 | The senses | 1 |
| 1.2 | Natural Science module 2 | 4 |
| 1.3 | The story of Louis Braille | 5 |
| 1.4 | The sense of hearing | 7 |
| 1.5 | The sense of smelling and taste | 10 |
| 1.6 | The sense of touch | 12 |
| 1.7 | Plants and animals | 13 |
| 1.8 | A simple food chain | 21 |
| 1.9 | Compare the growth of plants | 22 |
| 1.10 | Plant habitats | 23 |
| 1.11 | Usefulness of plants | 26 |
| 1.12 | Rooibos Tea | 27 |
| 1.13 | Potatoes | 31 |
| 1.14 | Maize | 33 |
| 1.15 | Other useful plants | 36 |
| 1.16 | A balanced diet | 37 |
| 1.17 | The digestive system | 39 |
| 1.18 | Water | 41 |
| 1.19 | The water cycle | 45 |
| 1.20 | The personal use of water | 47 |
| 1.21 | Water and its uses | 48 |
| 1.22 | Conservation of water | 50 |
| 1.23 | Supply clean water to households | 54 |
| 1.24 | When water is dangerous | 57 |

2 Term 2

| | | |
|------|---|-----|
| 2.1 | Menaing of the word ENERGY | 63 |
| 2.2 | The sun as a source of energy | 66 |
| 2.3 | The dangers of sunburn | 72 |
| 2.4 | Making energy available to people | 75 |
| 2.5 | Wind as a source of energy | 80 |
| 2.6 | Fire as a source of energy | 85 |
| 2.7 | Food as a source of energy | 92 |
| 2.8 | Man's use of electricity | 95 |
| 2.9 | Saving electricity | 100 |
| 2.10 | Making a simple electric switch | 105 |
| 2.11 | Dangerous ways of using electricity | 107 |
| 2.12 | Problems with electrical appliances | 111 |

3 Term 3

| | | |
|-----|--|-----|
| 3.1 | Investigating the mysteries of outer space | 113 |
| 3.2 | Talking about satellites | 117 |
| 3.3 | Sunrise and sunset | 119 |
| 3.4 | The earth and its movement | 121 |
| 3.5 | The stars and planets | 125 |
| 3.6 | The moon and its function | 127 |
| 3.7 | Talking about the weather | 132 |
| 3.8 | Weather forecasting | 136 |
| 3.9 | Stormy weather | 142 |

| | | |
|---------------------|--|-----|
| 3.10 | Describing the seasons | 147 |
| 3.11 | Talking about the oceans | 153 |
| 3.12 | Life at the north and south poles | 156 |
| 3.13 | The seasons in the polar regions | 160 |
| 4 Term 4 | | |
| 4.1 | Matter | 167 |
| 4.2 | Using material to design and make things | 172 |
| 4.3 | The states in which matter occurs | 174 |
| 4.4 | The use of materials in our houses | 177 |
| 4.5 | Fibres and fabrics | 180 |
| 4.6 | Planning to buiold a house | 182 |
| 4.7 | The value of building material | 186 |
| 4.8 | The dangers of pollution | 192 |
| Attributions | | 195 |

Chapter 1

Term 1

1.1 The senses¹

1.1.1 NATURAL SCIENCES

1.1.2 Grade 4

1.1.3 Life and way of living

1.1.4 Module 1

1.1.5 The senses

1.1.6

1.1.7 THE SENSES

We have separate names for the five senses: sight, hearing, smell, taste, and touch. People have a better sense of sight than some animals, while some animals, like cats and dogs, have developed a better sense of hearing. What do you think is the reason for this?

1.1.7.1 ACTIVITY :

1.1.7.2 LET'S TALK ABOUT THE SENSES

1.1.7.3 [LO 2.1]

Find pictures that can be used to illustrate the senses of people and animals in old magazines. Compare them and paste them on a sheet of paper.

Look at the pictures. Write the appropriate sense below each picture.



Figure 1.1

¹This content is available online at <<http://cnx.org/content/m21193/1.1/>>.



Figure 1.2



Figure 1.3



Figure 1.4



Figure 1.5



Figure 1.6



Figure 1.7



Figure 1.8



Figure 1.9



Figure 1.10

1.1.8 Assessment

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGEThe learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

ASSESSMENT STANDARD 2.1: The learner is able to recall significant information.

1.1.9 Memorandum

The different senses:

- Sight: boy reading a book
- Hearing: music (notes)
- Smell: flower
- Taste: fish and chips
- Touch: bath (skin feels water)

1.2 Natural Science module 2²

1.2.1 NATURAL SCIENCES

1.2.2 Grade 4

1.2.3 Life and way of living

1.2.4 Module 2

1.2.5 Learn more about the sense of light

1.2.6

1.2.7 Activity:

1.2.8 To learn more about the sense of light [LO 2.1]

Some wise person has said that the eyes are the windows to the soul of the person, because you are able to see what kind of person you meet when you look into someone's eyes.

Sight is one of the most important senses, because it gives you an idea of what is happening around you. Your eye needs light to be able to see. Light is reflected from everything around you and enters the eye through the little black hole in the centre of your eye, the **pupil**. The light may be from the sun or from an electric light bulb. If the light is not bright, the pupils enlarge slightly to allow more light to enter, but when it is bright, they contract. The image is taken via a nerve as a message to the brain.

Complete the illustration of the eye by neatly printing the captions on the lines.

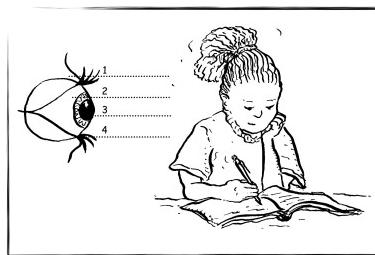


Figure 1.11

Have a group discussion on the following:

Why do some people wear glasses?

How should we behave towards children in the class who wear glasses?

Cover one eye. Now discuss the usefulness of having two eyes.

²This content is available online at <<http://cnx.org/content/m19912/1.1/>>.

Try to catch a ball when one eye is shut.

There are many blind people. Keep your eyes shut tightly for a few minutes. Concentrate on how you feel. How should we behave towards blind people?

1.2.9 Assessment

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGEThe learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

ASSESSMENT STANDARD 2.1: The learner is able to recall significant information.

1.2.10 Memorandum

Captions for illustration of the eye:

1. eyelid
2. eyeball
3. pupil
4. eyelashes

1.3 The story of Louis Braille³

NATURAL SCIENCES

1.3.1 GRADE 4

1.3.2 Life and way of living

1.3.3 Module 3

1.3.4 The story of Louis Braille

This is for those of you who are inquisitive [LO 2.1]:

- Find out what has been done especially for blind people at the Kirstenbosch Botanical Garden in Cape Town.
- Your educator will read the story of Louis Braille to the class. Write a short message in Braille to your friend (no more than three words). Use the picture of Braille writing that is given.
- Try to create Braille writing on a piece of cardboard.

³This content is available online at <<http://cnx.org/content/m19913/1.1/>>.

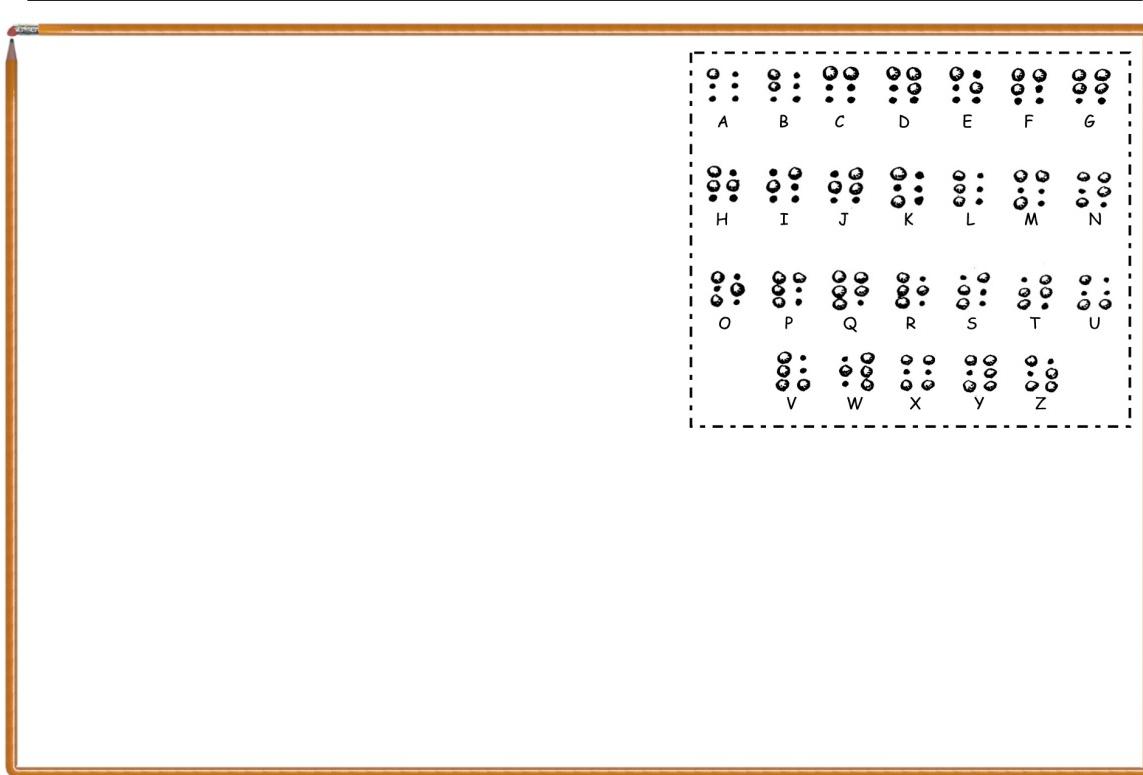


Figure 1.12

1.3.5 Assessment

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGE The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

ASSESSMENT STANDARD 2.1: The learner is able to recall significant information.

1.3.6 Memorandum

Kirstenbosch Botanical Garden in Cape Town.

- Blind people can rub leaves to smell them and to feel the texture
- There is a rail for them to hold on to and to guide them through the garden.

Plants are identified with notes in Braille, so that they are able to read about them.

The story of Louis Braille

Many years ago, a boy called Louis lived in France with his parents. He was very inquisitive and was interested in everything that happened around him. His father was a saddle maker and made saddles for other people's horses.

One day Louis took his father's sharp knife – without his father's permission – and tried to cut a piece of leather in his father's workshop. He had never worked with the knife, which slipped and cut into one of his

eyes. Within three days both eyes had become infected and shortly afterward he lost his sight. Both eyes were blind.

Louis remained interested in everything that happened around him, but soon discovered how difficult it is to be blind. He had to go to a special school for the blind and found their manner of reading very difficult. Letters were embossed on the pages – they stood out slightly – but it was difficult to read and reading was very slow.

He became determined to find an easier way to read. One day a military officer came to address the children at the school. He spoke to them, about the methods that they used to send messages at night. Louis got the idea to develop an alphabet using six raised dots. This kind of writing is called Braille, and it consists of a code of dots on paper. You read this writing by running your fingers over the raised dots.

Louis eventually became a teacher and taught at the school. He taught all the blind learners to read Braille, of course. This method represents a vast improvement of the technology and blind people are now able to read much more easily than previously and can therefore learn in the same way as normal learners.

1.4 The sense of hearing⁴

NATURAL SCIENCES

1.4.1 Grade 4

1.4.2 Life and way of living

1.4.3 Module 4

1.4.4 The sense of hearing

1.4.5

1.4.6 Activity: To learn more about the sense of hearing [LO 2.1]

Listen to the tape recording that your educator will play and try to distinguish the different sounds. Your hearing enables you to hear wonderful sounds, like the sound of music, even a pin that is dropped, and a cannon being fired. It will also warn you when a car hooter is sounded behind you.

⁴This content is available online at <<http://cnx.org/content/m19914/1.1/>>.

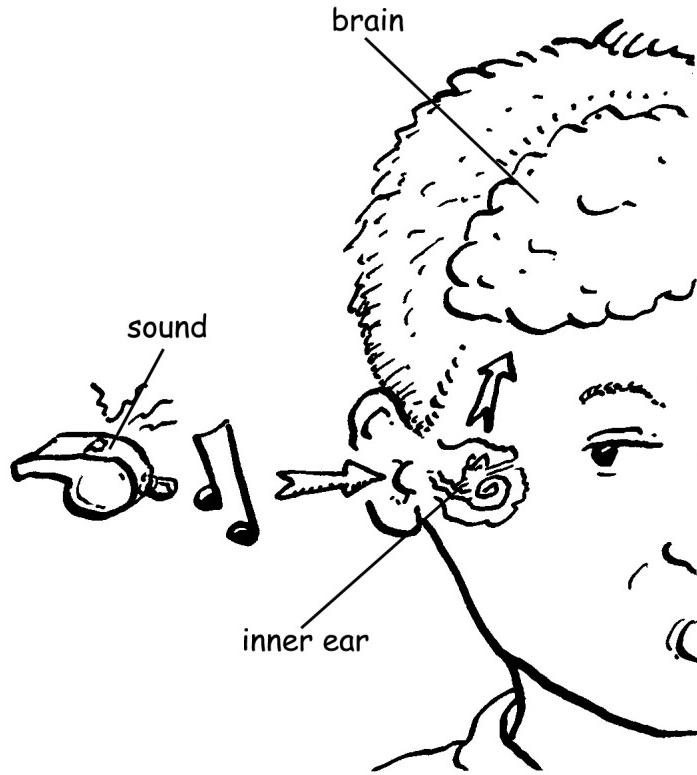


Figure 1.13

Your ears are more than two flaps at the side of your head.

The rest is inside your head where it is protected by the hard skull. The outer part catches the sound waves that come on the air and directs them into the ear. Inside the ear, the sound waves are converted into messages that are taken to the brain by nerves. Your clever brain then tells you what you are hearing. The brain also sorts out all the sounds that you hear.

Find out why you have two ears.

Find out what deaf people do to improve their lives. See if you are able to use finger language by using the code illustrated below.



Figure 1.14



Figure 1.15

Many animals turn their ears to determine the direction of the sounds they hear. This means that they do not have to turn their heads. If they had to turn their heads, their enemies would detect them by their movements.

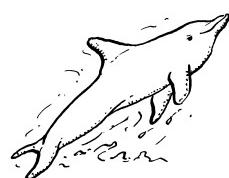


Figure 1.16

Sound waves can move through water more easily than light waves, therefore dolphins rely on hearing rather than on trying to see their enemies in the deep, dark water of the sea.

1.4.7 Assessment

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGEThe learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

ASSESSMENT STANDARD 2.1: The learner is able to recall significant information.

1.4.8 Memorandum

Play a recording of a variety of sounds taped by yourself, or one selected from the library.

1.5 The sense of smelling and taste⁵

1.5.1 NATURAL SCIENCES

1.5.2 Grade 4

1.5.3 Life and way of living

1.5.4 Module 5

1.5.5 The senses of smell and taste

Activity: To learn more about the senses of smell and taste [LO 2.1]

When you eat, the tongue tastes the taste of the food and your nose smells the flavour. This is how it works:

The openings of your mouth and nose come together in your throat, behind your mouth. The flavours of the food that you eat go to your nose from the back of your mouth. From there, nerves take a message to the brain and the brain tells you what you smell.



Figure 1.17

⁵This content is available online at <<http://cnx.org/content/m19915/1.1/>>.

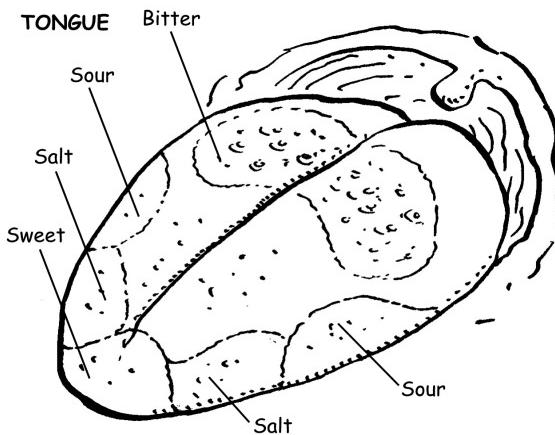


Figure 1.18

The tongue is rough and covered in taste buds to determine different tastes. Write down what the four tastes are that your tongue can identify:

Now pinch your nostrils together with your fingers to close your nose and drink some tea or cooldrink. Why is the taste different?

What have you noticed when you eat while you have a cold?

The sense of smell is very important in the animal world.

Write a proper sentence to say something about the sense of smell of each of the following animals.

Skunk:

Jackal:

Dog:

Antelope:

Rhinoceros:

Hoopoe:

Think of other ways in which animals are able to protect themselves because of their sense of smell.

Try this: Ask someone to mark a route with vanilla or vinegar, without you seeing it. Then try to follow the route by depending on your sense of smell!

1.5.6 Assessment

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGEThe learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

ASSESSMENT STANDARD 2.1: The learner is able to recall significant information.

1.5.7 Memorandum

- a. sweet
- b. salty
- c. bitter
- d. sour

When the nostrils are pinched together, scents cannot enter the nose, so you will only distinguish sweet, sour, salty and bitter.

In the case of a cold: the same as above.

The sense of smell in the animal world.

Skunk: Protects itself by spraying a strong smelling / pungent secretion in the direction of the enemy.

Jackal: Depends on its sense of smell when hunting. It also has scent glands that secrete scent as it goes along and helps it to find the way on its return.

Dog: Smells very well. Because of their well-developed sense of smell, dogs are used to sniff out drugs, explosives and even people in crowds. They also use their sense of smell when they are hunting.

Antelope: Uses its sense of smell to stay out of danger. If they smell an enemy, antelopes run off very quickly.

Rhinoceros: They also have scent glands underneath their feet to leave messages for other rhinoceroses.

Hoopoe: Birds usually keep their nests very clean, but not the hoopoe. Part of its defence mechanism is to not clean the nest so that the smell will keep predators away.

1.6 The sense of touch⁶

1.6.1 NATURAL SCIENCES

1.6.2 Grade 4

1.6.3 Life and way of living

1.6.4 Module 6

1.6.5 The sense of touch

Activity: To learn more about the sense of touch

The sense of touch helps you to know what things feel like when they are against your skin. When you touch anything, nerves send messages to our brain. If the feeling is unpleasant, the brain sends a message to tell you to take your hand away. If the feeling is pleasant, the brain sends a message to say that you may leave your hand where it is.

Your sense of touch tells you whether something is warm or cold, hard or soft, rough or smooth.

It can also tell you when something hurts you, by feeling pain.



Figure 1.19

Answer the following questions:

⁶This content is available online at <<http://cnx.org/content/m19916/1.1/>>.

How do you feel about pain?

Can feeling pain be good?

Explain your answer:

In nature, tarantula spiders use their sense of touch to catch their prey, because they hunt at night.

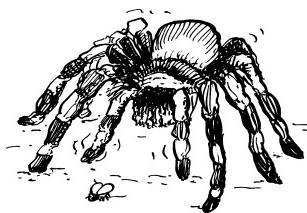


Figure 1.20

An insect's sense of touch is its best sense organ. It gets information about temperature and the environment by means of feelers.

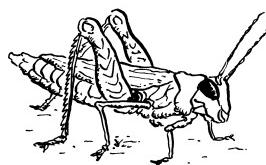


Figure 1.21

1.7 Plants and animals⁷

1.7.1 NATURAL SCIENCES

1.7.2 Grade 4

1.7.3 Life and way of living

1.7.4 Module 7

1.7.5 Plants and animals

Animals cannot make food for themselves. Some of them eat plants, while some eat other animals.

⁷This content is available online at <<http://cnx.org/content/m19917/1.1/>>.

1.7.6 Activity: Sort these animals according to the food that they eat [LO 2.2]

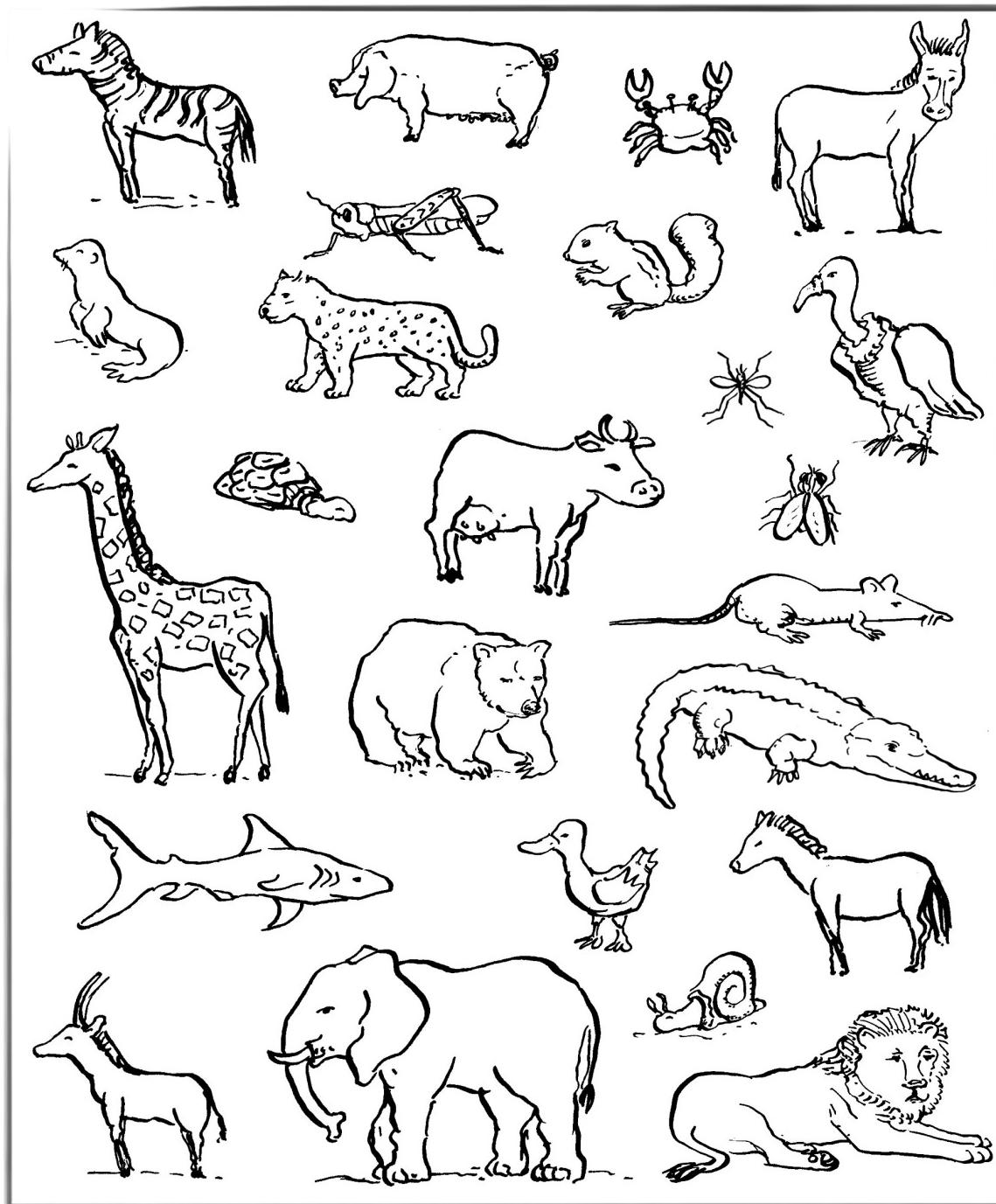


Figure 1.22

Examine the pictures. Sort out the animals according to the groups listed below, by neatly redrawing them in their groups on the three sheets of A4-sized paper. Also collect pictures (from old magazines) of the kinds of food they eat and paste these with your drawings.

Animals that eat plants

Animals that eat other animals

Animals that eat plants and animals

**Figure 1.23**

herbivores(plant - eating animals)

**Figure 1.24**

carnivores(meat - eating animals)

**Figure 1.25**

omnivores (animals that eat all foods)

Examples of herbivores: elephants, zebras, antelopes, tortoises, cows, donkeys, locusts, snails, horses, squirrels, giraffes, etc.

These eat foods such as leaves, fruit, flowers, seeds, roots and grass.

Examples of carnivores: jackals, leopards, seals, crocodiles, sharks, lions, mosquitoes, vultures, etc..

These eat foods such as birds, fish, eggs, worms, insects, other animals.

Examples of herbivores: rats, flies, pigs, bears, ducks, crabs and people, of course!

They eat foods that they get from plants and animals.

1.7.7 Assessment

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE

KNOWLEDGE

The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

ASSESSMENT STANDARDS 2.2: The learner is able to categorise information.

1.7.8 Memorandum

The required information is in the notes.

1.8 A simple food chain⁸

1.8.1 NATURAL SCIENCES

1.8.2 Grade 4

1.8.3 Life and way of living

1.8.4 Module 8

1.8.5 A simple food chain

To have an understanding of a simple food chain

All animals and plants need food to remain healthy and have enough energy. Plants have the unique ability to manufacture their own food. For this, they use sunlight, carbon dioxide from the air and water and minerals from the soil.

All living things need food manufactured by green plants. The different parts of the food chain are like the links of a chain: if one link is missing, the chain is of no use until it is fixed. Each part of the food chain is important for the existence of the ecosystem.

The following food chains are faulty. Correct them:

Maize, sun, farmer, egg, hen

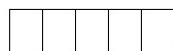


Table 1.1

Cow, boy, sun, grass, milk



⁸This content is available online at <<http://cnx.org/content/m19918/1.1/>>.

Table 1.2

Lion, antelope, grass, sun

**Table 1.3**

Raptor, sun, mouse, wheat

**Table 1.4**

Now make your own food chain

**Table 1.5**

1.8.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONSThe learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard 1.3: The learner evaluates data and provides feedback on observations.

1.8.7 Memorandum

- Sun, maize, hen, egg, farmer
- Sun, grass, cow, milk, boy
- Sun, grass, antelope, lion
- Sun, wheat, mouse, raptor/bird of prey

1.9 Compare the growth of plants⁹

1.9.1 NATURAL SCIENCE

1.9.2 Grade 4

1.9.3 Life and way of living

1.9.4 Module 9

1.9.5 Compare the growth of plants in various circumstances

1.9.6 Activity:

1.9.7 To compare the growth of plants in various circumstances [LO 1.1, 1.2, 1.3]

The habitat of a plant is determined by the soil type and the climatic region where it grows best. Some plants prefer dry soil in a hot area and therefore do not need much water for growth. Other plants, again, like wet soil in cold regions because they need much water to survive.

⁹This content is available online at <<http://cnx.org/content/m19919/1.1/>>.

Let us grow a plant: bring a variety of seeds to school. Plant them in well-drained soil in plant trays (six-pack).

- Work in groups of six learners. Each learner should bring a plant tray and a few seeds. Try maize, bean and sunflower seeds – they grow quickly.
- Use six plant trays for 12 seeds, planting two seeds in each bowl.
- Place five of the plant trays in a sunny spot and water them regularly.
- Place the sixth tray in a dark corner and do not water it.
- Use the remaining seeds to create a collage.

Once the plant has grown well, you can remove it from the soil to compare it with your partner's plant. The best plants can be dried between sheets of paper from old telephone directories. When they are ready, you may paste a plant on a sheet of paper and write captions (neatly) to identify the different parts, e.g.: roots, stem, leaves, flower.

Next we will compare our plants with those that have not had water and sunlight. Draw these in the spaces below and write your conclusion in the space that is provided.

Plant with sunlight and water **Plant without sunlight and water**

1.9.8 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATION The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standards: We know this when the learner

1.1 plans investigations;

- takes the lead in investigating and collecting data;
- evaluates data and provides feedback on observations

1.9.9 Memorandum

Habitats of plants:

Water: Some plants grow under water and others grow on the water

Deserts: Some plants can grow in deserts where it is hot and dry, and where there is very little water, e.g. cacti and mesems (mesembrythems)

Mountains: Plants that grow on mountains must be able to withstand bitterly cold and strong winds: lichens, bitter-bush, disa, protea and sugarbush

Forests: Such plants grow in shade: Orchids, ferns and mosses

Veld: Fynbos and some proteas, restios

Botanical gardens: indigenous plants, usually

Semi-desert: The plants grow in dry areas, where there is little rain: karoo bushes, cacti

Any other appropriate answer

1.10 Plant habitats¹⁰

NATURAL SCIENCES

¹⁰This content is available online at <<http://cnx.org/content/m19920/1.1/>>.

1.10.1 Grade 4**1.10.2 Life and way of living****1.10.3 Module 10****1.10.4 Plant habitats**

Do brainstorming about plant habitats and write a list of as many plant habitats as you can think of:

Select a plant that grows in your garden or in your environment. Find out the following:

Does the plant need to be watered well?

Does the plant prefer little or much sunlight?

What type of soil does the plant prefer?

Sketch the plant as it occurs in its natural habitat, in the space below.



Figure 1.26

Answer the following questions:

1. Name three things that plants need for growth.
1. What is the best kind of soil for plants?
1. What is the name of the gas that is released by plants?
1. Can plants manufacture their own food?

An interesting idea:

Make a bird cake to encourage birds to come into your garden. Your educator will tell you how to do it.

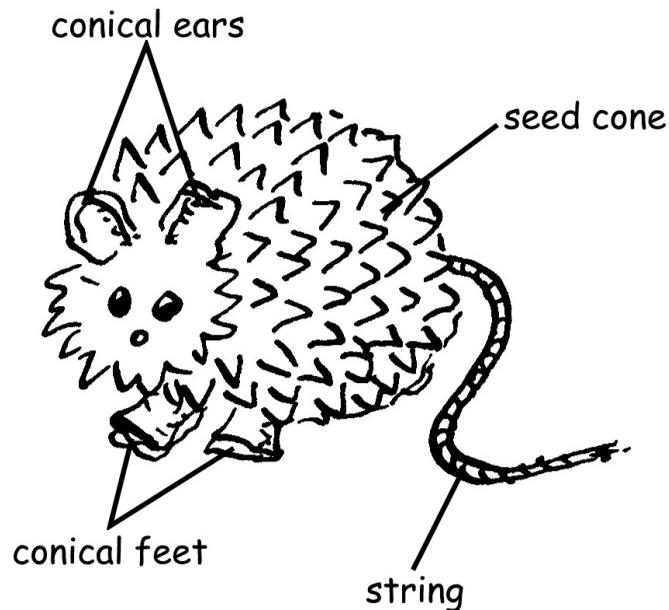


Figure 1.27

1.10.5

1.10.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATION The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standards: We know this when the learner

- 1.1 plans investigations;
- 1.2 takes the lead in investigating and collecting data;
- 1.3 evaluates data and provides feedback on observations

1.11 Usefulness of plants¹¹

1.11.1 NATURAL SCIENCES

1.11.2 Grade 4

1.11.3 Life and way of living

1.11.4 Module 11

1.11.5 The usefulness of plants

1.11.6 Activity:

1.11.7 To discuss, investigate and describe the usefulness of plants [LO 1.1, 1.2, 1.3, 2.1]

Plants have other uses for people, besides providing food. Plants release the oxygen that people need to inhale. When plants die, they provide compost, which makes the soil fertile. Animals also live from plants, some animals shelter under plants and plants provide homes for birds, reptiles and some mammals. If we had no plants, we would also have no meat, milk and eggs, because the animals that provide these foods need plants for food.

1.11.7.1 Find answers to the following statements:

1. Aspirin, etc. is obtained from the bark of willow trees
2. It is used in ointments and tastes awful
3. It is obtained from sap (latex) that is collected from slashes in the bark of rubber trees
4. It protects against colds and is used to flavour food
5. It is used as medicine, flavourants in food, scent, beauty products, toiletries and insect repellents
6. It is obtained from the chamomile plant and can help you to relax
7. It is obtained from a range of trees
8. It is obtained from the fibres in the leaves of sisal plants
9. It is obtained from the seed fibres of the cotton plant

Summative mark

1.11.8 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONSThe learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standards: We know this when the learner

1.1 plans investigations;

- takes the lead in investigating and collecting data;
- evaluates data and provides feedback on observations

2.1 recalls significant information

¹¹This content is available online at <<http://cnx.org/content/m20222/1.1/>>.

1.11.9 Memorandum

Answers to the statements:

1. herbs
2. garlic
3. tea
4. medicine
5. cork
6. rubber
7. cotton
8. castor oil
9. string

10. wood
11. tea

1.12 Rooibos Tea¹²

1.12.1 NATURAL SCIENCES

1.12.2 Grade 4

1.12.3 Life and way of living

1.12.4 Module 12

1.12.5 Rooibos Tea

Rooibos Tea – a useful plant

The Rooibos tea plant is a useful plant with wonderful properties. Infusions made from it are not only taken as tea, but can be used successfully in beauty products. Listen well to what your educator tells you about it, so that you can set up a memory chart on rooibos tea. Make a drawing of a rooibos tea plant in the middle of the page. Write these captions around the drawing: Habitat, Growth, Care, Appearance. Your educator will write the facts on the chalkboard. You have to write it in the correct places, so try to remember what you hear.

Arrange a tea tray (group work) and serve tea to your teacher in the proper way!

¹²This content is available online at <<http://cnx.org/content/m19921/1.1/>>.



Figure 1.28

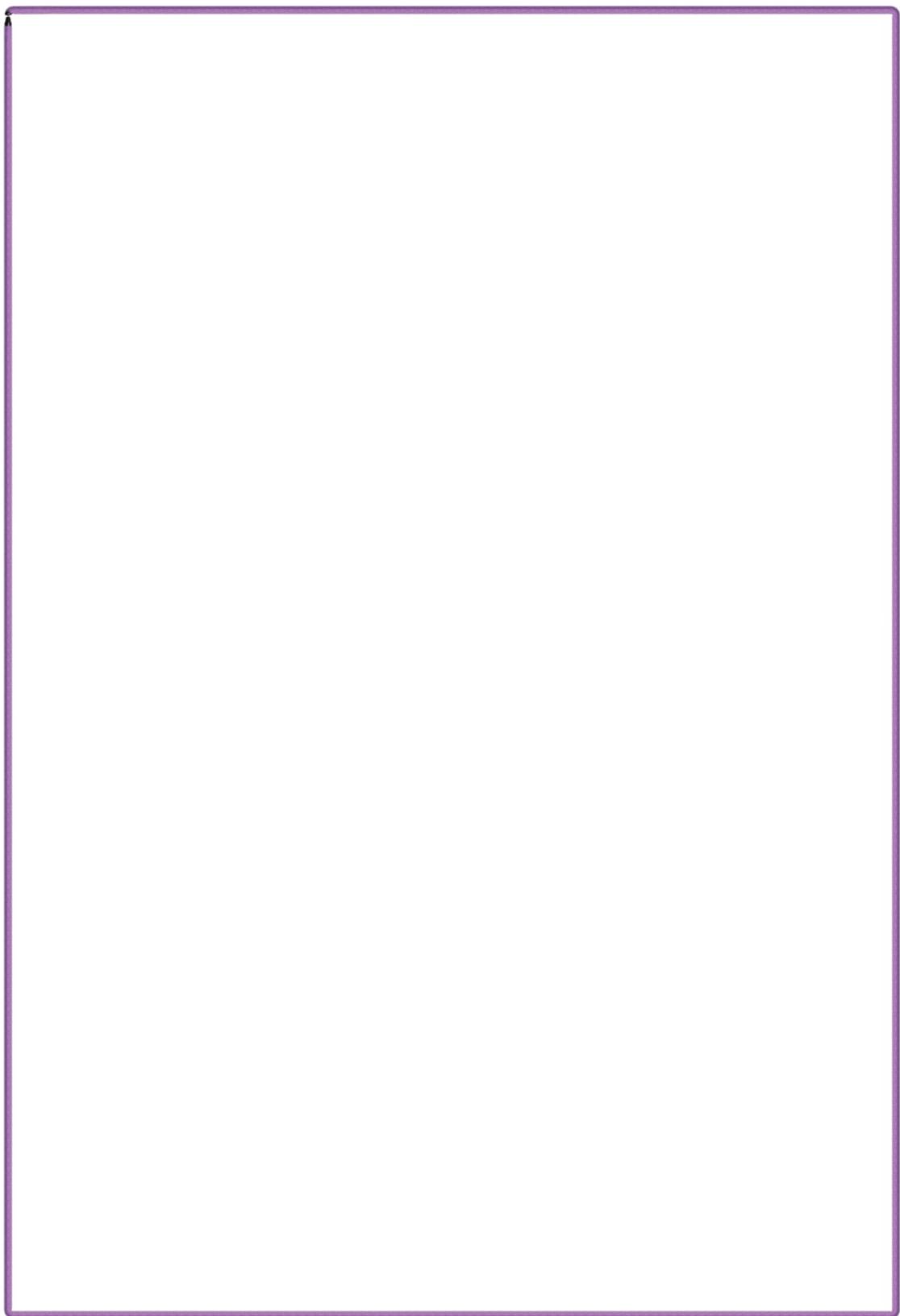


Figure 1.29

rooibos tea

1.12.6 Memorandum

Present lesson, show pictures, etc. The memory chart is a summary of what has been learnt. This exercise teaches learners how to compile a memory chart.

- Make a drawing of a rooibos tea plant in the middle of the page.
- Write four captions around the drawing: Habitat; Growth; Care; Appearance
- Write these facts concerning habitat on the chalkboard and have the learners memorise them.

- Clanwilliam
- Sederberg mountains
- Winter rainfall
- Sandy soil
- Erase the information from the board and let the learners write it down from memory.
- Repeat this procedure for the rest of the factual information.

Appearance

- Delicate plant
- Needle-like leaves

Growth

- Seed
- Seedling
- Plant
- Harvest
- Bind in sheaves

- Shred
- Dry

Care

- Sensitive plant
- Protect from wind
- Protect from insects
- Control weeds

1.13 Potatoes¹³

1.13.1 NATURAL SCIENCES

1.13.2 Grade 4

1.13.3 Life and way of living

1.13.4 Module 13

1.13.5 Potatoes

1.13.6

1.13.7 POTATOES

The potato must be the most popular vegetable in every home. Potatoes are swollen roots (tubers) that grow underground and they are used for many dishes.



Figure 1.30

Potatoes are grown from seed or from seed potatoes. They are an important source of starch, but also contain vitamins and minerals that are required in a healthy diet. The starch is an important source of energy for the body.

- Plant a seed potato in your garden and see whose potato plant has grown the most in three weeks!
- Have group discussions to find out about the different ways in which potatoes can be used.
- Bring a recipe for a potato dish to school and paste it to the back of this page.

¹³This content is available online at <<http://cnx.org/content/m19923/1.1/>>.

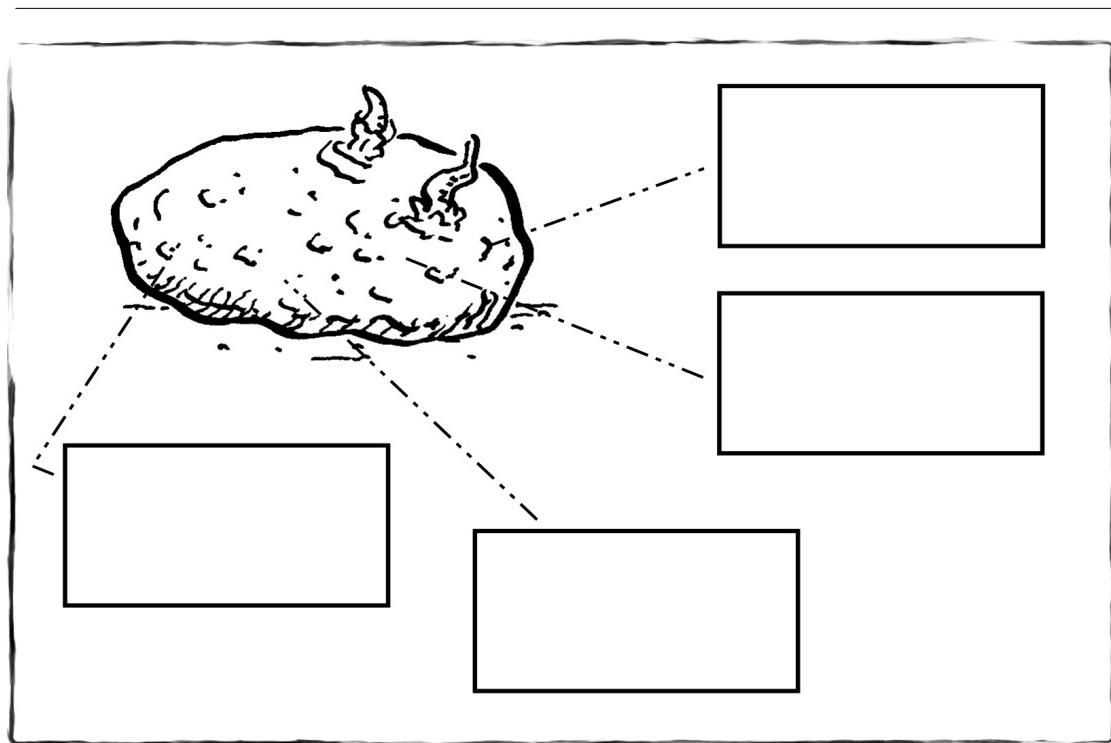


Figure 1.31

Write a brief sentence about potatoes in each square of the illustration. Use these words:

eye
stem
soil
nutrients

1.13.8 Memorandum

POTATOES

- Different ways in which we can use potatoes: cook, make potato salad, fry, bake, boil and mash, use in soup, in cakes, in puddings, in baking bread, etc.
- Captions for illustrations
- The eye grows to form a new plant.
- This is where the stem grew.
- Potatoes prefer sandy soil

Potatoes contain nutrients like starch, vitamins and proteins.

1.14 Maize¹⁴

1.14.1 NATURAL SCIENCES

1.14.2 Grade 4

1.14.3 Life and way of living

1.14.4 Module 14

1.14.5 Maize

1.14.5.1 MAIZE (MEALIES)

Maize forms a very important part of a balanced diet for many South Africans. It is one of our country's most important grains and cultivating it provides work for thousands of farmers and workers. It is an important animal food as well, and a raw material for the manufacture of paper, paint, textiles, medicine and food products. It is important as a source of energy.

1.14.5.2 Assignment

Plant some maize seeds in soil prepared with compost. Plant them 2 cm deep and about 30 cm apart.

Listen attentively to what your educator tells you about maize.

¹⁴This content is available online at <<http://cnx.org/content/m19924/1.1/>>.

MAIZE

What is maize used for?
Do the pictures help you?

.....
.....
.....
.....
.....

What makes maize grow?

.....
.....
.....

When is maize planted
and when is it harvested?

- ↗ spring:
- ↗ summer:
- ↗ autumn:
- ↗ winter:

What problems do maize farmers have to cope with?

.....
.....
.....

Figure 1.32

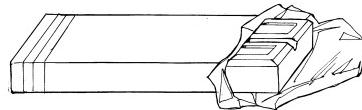


Figure 1.33

Be a chef: Develop your own recipe for chocolate biscuits. Use melted chocolate, some coconut, green and red cherries, nuts and breakfast cereal made from maize, e.g. Cornflakes. Be sure to have the help of an adult when you melt the chocolate.

1.14.6 Memorandum

Maize grows well when it has:

- Sunny weather
- No frost
- Good rains

Problems experienced by maize farmers:

- Weeds
- Hail storms
- Drought

Uses of the maize plant

- Samp
- Mealie /maize meal
- Sweets
- Breakfast cereals
- Fodder
- Starch
- Paper

Growth of the maize plant

- Spring - planting
- Summer - growing
- Autumn - ripening
- Winter - harvesting

1.15 Other useful plants¹⁵

1.15.1 NATURAL SCIENCES

1.15.2 Grade 4

1.15.3 Life and way of living

1.15.4 Module 15

1.15.5 Other useful plants

1.15.5.1 OTHER USEFUL PLANTS

Indicate the uses of each of the following plants (three uses for each):

Grapes:

Wheat:

Cauliflower:

Peanuts:

Make picture chains for tomatoes, peaches, mushrooms and oranges:

The subject of the picture chain must be: Where food comes from and what happens to it before we eat it.

Useful plant _____ **What happens to it?** _____ **How we eat it?** Tomato Canned tomato Tomato sauce on food _____

1.15.6 Memorandum

OTHER USEFUL PLANTS

The uses of each of the following plants (three uses for each):

- Grapes: vinegar, wine, raisins, jam, etc.
- Wheat: bread, cake, breakfast cereal, etc.
- Cauliflower: boil and serve with white sauce, salad, bake with cheese and bacon, etc.
- Peanuts: sweets, chocolate, peanut butter, etc.

Picture chains: Use own initiative

¹⁵This content is available online at <<http://cnx.org/content/m20225/1.1/>>.

1.16 A balanced diet¹⁶

1.16.1 NATURAL SCIENCE

1.16.2 Grade 4

1.16.3 Life and way of living

1.16.4 Module 16

1.16.5 Describe a balanced diet

1.16.5.1 Describe a balanced diet

See if you can remember what you ate for supper last night! And for breakfast before school?

Foods are divided into four food groups. We need to eat something from each group daily to follow a healthy diet.

All living creatures need food for energy to move around, to grow and to repair cells that become damaged. All living creatures also have digestive systems to extract the nutrients that the body needs from the food that is eaten.

Food groups:

Proteins help the body to produce new cells and to grow up healthy and strong.

Sources of protein are: meat, fish, cheese, eggs, milk, soy beans, nuts.

Vitamins keep the body healthy and make bones and teeth strong.

Sources of vitamins are: fruit and vegetables, liver, milk, oily fish.

Fats supply energy. Energy is stored in fats in the body until it is needed.

Sources of fats are: butter, milk, cheese, nuts, cream, sardines, margarine, oil.

Sugar and starch (carbohydrates) also supply energy to the body.

Sources of starch and sugar are: fruit, biscuits, sweets, bread, ordinary sugar, potatoes, rice.

Minerals: Calcium builds strong bones, teeth and muscles. Iron helps red corpuscles to transport oxygen from the lungs to the rest of the body.

Sources of minerals are: milk, cheese, fish, vegetables, fruit, liver, white bread.

- Draw the sources of food groups on the vertices of the cube. Then cut and fold it as indicated and hang it in the class.

Work out a balanced menu for one day, for three meals.

Find out what is the staple food in our country, and in other countries.

¹⁶This content is available online at <<http://cnx.org/content/m19925/1.1/>>.

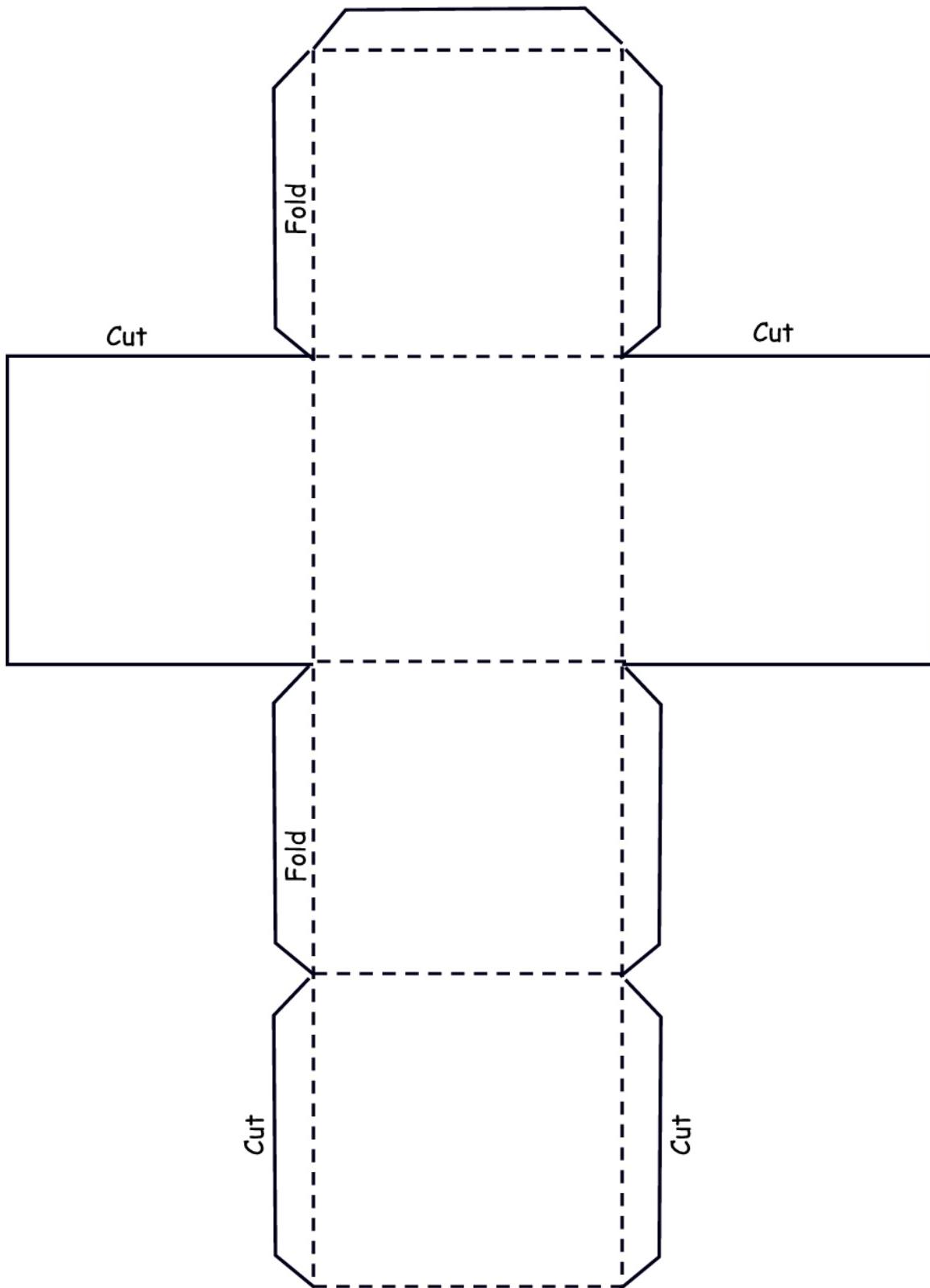


Figure 1.34

1.16.6 Memorandum

Use the cube pattern that is supplied. Let the learners draw on it and hang the completed cubes in the classroom.

Staple foods:

- South Africa: bread (What about maize? – most black people eat this regularly)
- Italy: spaghetti
- Ireland: potatoes
- China: rice

1.17 The digestive system¹⁷

1.17.1 NATURAL SCIENCES

1.17.2 Grade 4

1.17.3 Life and way of living

1.17.4 Module 17

1.17.5 The digestive system

1.17.6 Learn about the digestive system and to name a few important organs in the system

Let us look at how the digestive system works: Your body needs food to grow and to remain healthy. A long canal runs from your mouth, right through the body to the opening where the food (residue) leaves the body again. The upper part of this canal is fairly straight, but the lower part is convoluted. Several things happen to the food while it travels along this canal.

When you chew your food, your teeth and tongue grind it and the saliva helps you to swallow it.

The food gets pushed through the oesophagus to the stomach. Muscles in the walls of the oesophagus contract automatically to do this. We speak of the **peristaltic** action of the oesophagus.

In the stomach, the food is mixed, ground and stirred by the muscles of the stomach wall.

Nutrients are removed from the food in the small intestine and are transported to other parts of the body by the blood.

What is left of the food goes through the large intestine, where water is mainly taken up, before the residue that is not needed leaves the body when the bowels are emptied.

Complete the illustration by filling in the captions.

¹⁷This content is available online at <<http://cnx.org/content/m19926/1.1/>>.

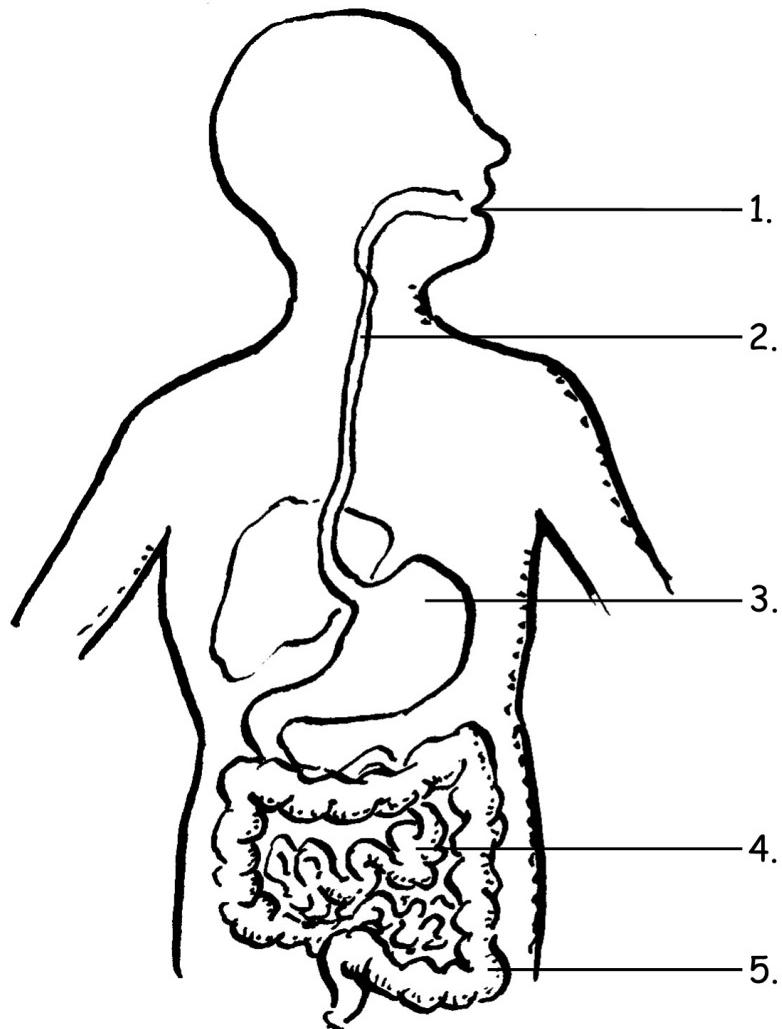


Figure 1.35

Write a proper sentence to explain why babies are able to live on milk alone.

1.17.7

1.17.8 Memorandum

1. mouth
2. oesophagus
3. stomach
4. small intestine
5. large intestine

1.18 Water¹⁸

1.18.1 NATURAL SCIENCES

1.18.2 Grade 4

1.18.3 Module 18

1.18.4 Water

1.18.5 The importance of water

Listen to the story about water that your educator will read to you and discuss the information that you find inside the drop of water.

¹⁸This content is available online at <<http://cnx.org/content/m19927/1.1/>>.

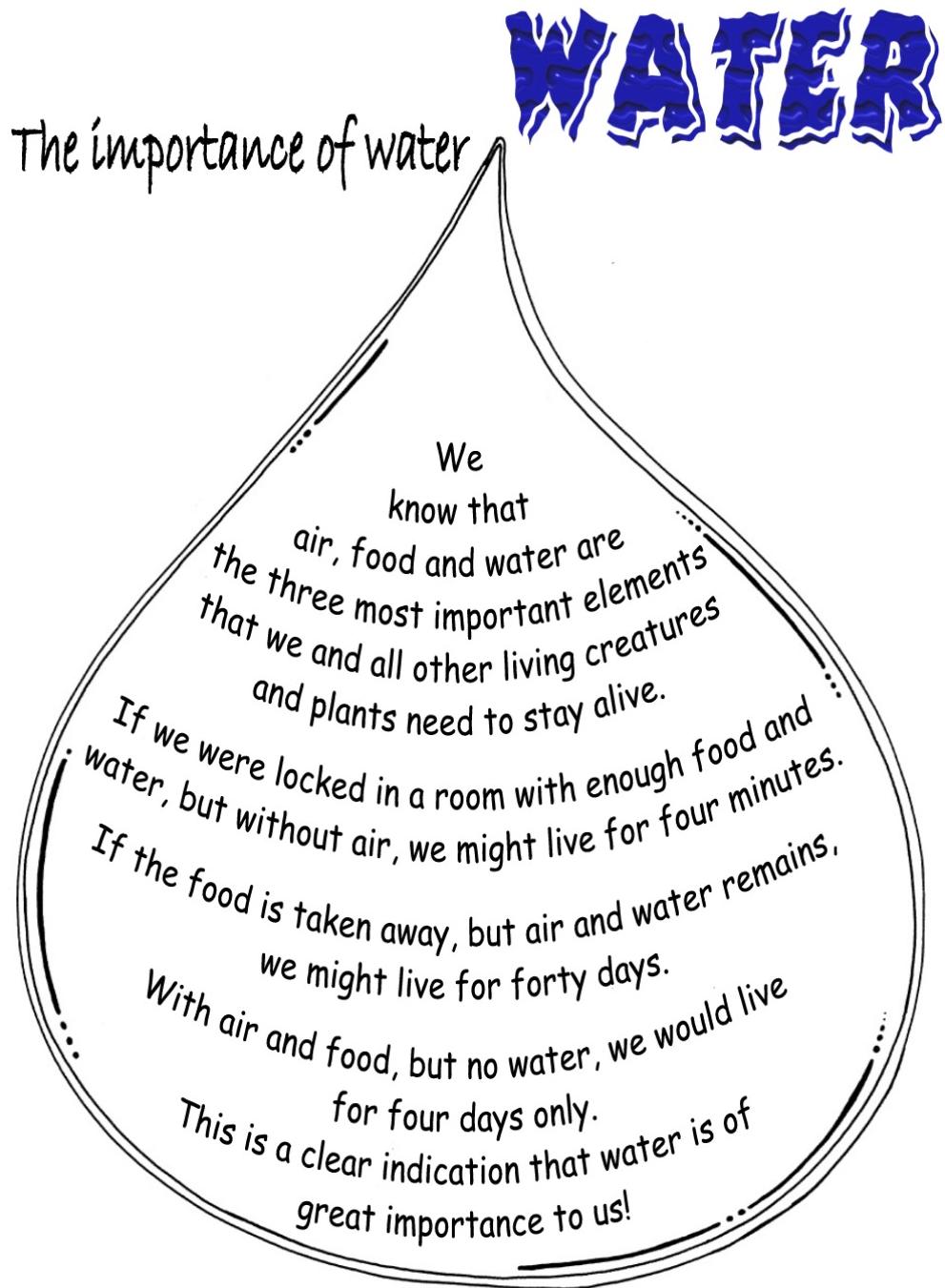


Figure 1.36

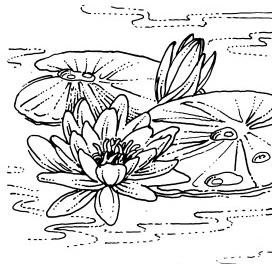


Figure 1.37

Water plays a very important role in the ecosystem; it keeps plants and animals alive.

Plants: We know that some plants only grow in water. You may know the beautiful water lilies with their large flat leaves that float on the water.

Animals: Animals drink water to live. It is essential for animals that live in, on and near water

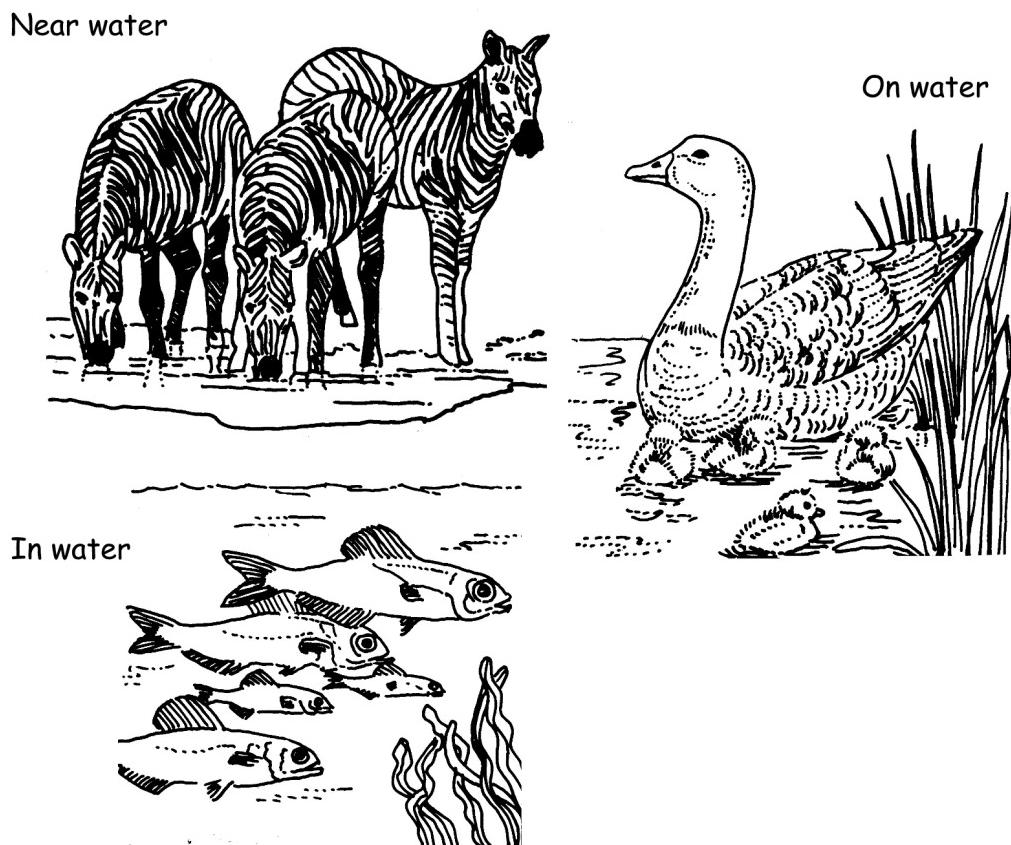


Figure 1.38

Discuss the following with the learners in your group:

What would happen if the school had no water for an hour?

What would happen if our city / town had no water for an hour?

What would happen if our country had no water for an hour?

Why is water as important as it is?

Read any story about water to the learners.

Select the best answers from your group to write captions for the illustration.

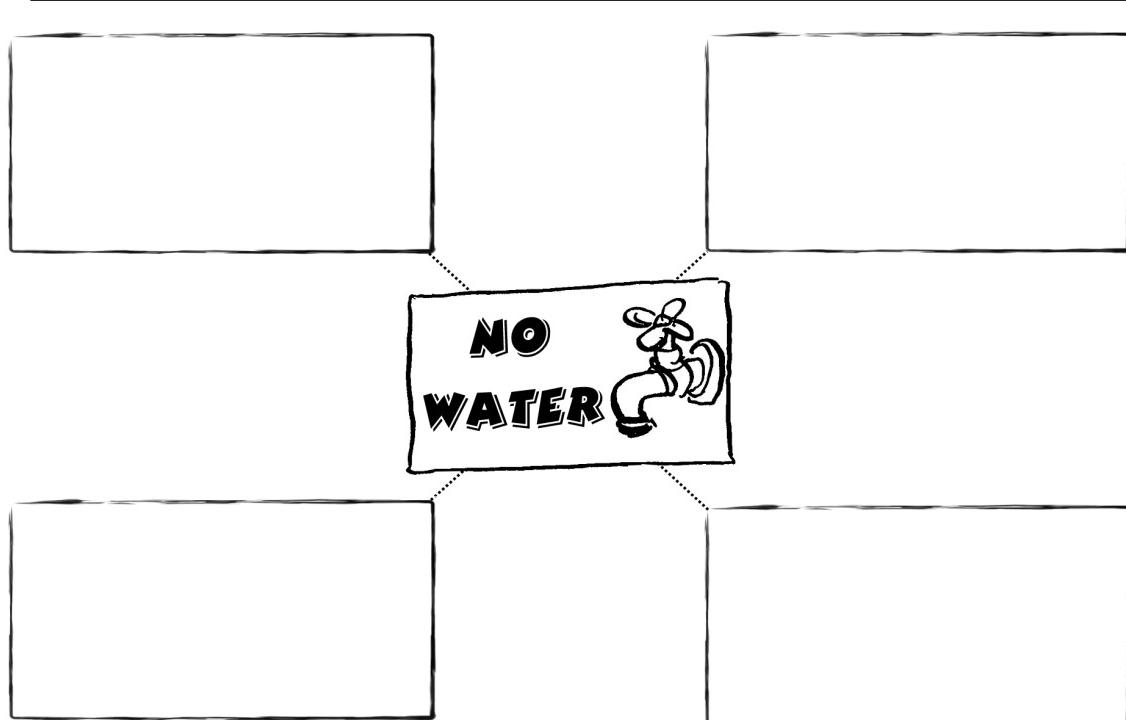


Figure 1.39

1.18.6 Memorandum

Read any story about water to the learners.

Captions in frames: After the groups have given feedback, the best answers can be copied into the frames of the illustrations.

1.19 The water cycle¹⁹

1.19.1 NATURAL SCIENCES

1.19.2 Grade 4

1.19.3 Life and way of living

1.19.4 Module 19

1.19.5 The water cycle

Water falls to the earth in the form of rain. Before this happens, millions of tiny water droplets float around on the air and form clouds. Seawater, rivers and lakes are classed as surface water. Water that occurs below

¹⁹This content is available online at <<http://cnx.org/content/m19929/1.1/>>.

the surface of the earth and comes to the surface as fountains or at bore-holes is known as underground water.

Surface water evaporates, rises up high above the earth, cools down and becomes drops of water once more. This is known as condensation. The millions of water droplets unite to form clouds. When the clouds become heavy from so much water, drops fall to the earth as rain. It eventually collects in rivers and dams.

1.19.6 Draw a sketch to illustrate the water cycle. Use red arrows to show the evaporation of water and blue arrows to show condensation. [LO 2.1]



Figure 1.40

1.19.7 Assessment

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGEThe learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

ASSESSMENT STANDARD: WE KNOW THIS WHEN THE LEARNER

- recalls significant information.

1.19.8 Memorandum

Water sources

The water cycle must include the sea, the sky, sun, clouds, rain, vegetation, a river, red and blue arrows to indicate evaporation and condensation.

1.20 The personal use of water²⁰

1.20.1 NATURAL SCIENCES

1.20.2 Grade 4

1.20.3 Life and way of living

1.20.4 Module 20

1.20.5 The personal use of water

1.20.6 The personal use of water [LO 1.2]

Write down all the activities in which you use water during a single day. Compare it with what your classmates have written. Ask your parents to show you how the water meter at your house works.

1.20.7 Memorandum

The ways in which having running water in the home makes life easier.

- We can bath or shower without first having to fetch water.
- We do not have to fetch water to wash dishes.
- Having running water in the home saves time and energy.
- Laundry can be washed easily, our hands are not exposed to the chemicals in soap powders (if you have washing machine!)
- It is easier to keep everything clean and neat.
- We can have flush toilets, so we merely pull a chain and everything remains clean and free of germs.
- We merely have to turn the tap to be able to wash vegetables before eating or cooking them.
- We have drinking water available all the time.

It is easy to bath and take care of pets if we have clean water.

1.20.8 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONSThe learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

ASSESSMENT STANDARDS: WE KNOW THIS WHEN THE LEARNER

1.2 takes the lead in investigating and collecting data.

²⁰This content is available online at <<http://cnx.org/content/m19931/1.1/>>.

1.21 Water and its uses²¹

1.21.1 NATURAL SCIENCES

1.21.2 Grade 4

1.21.3 Life and way of living

1.21.4 Module 21

1.21.5 Water and its uses

1.21.6 Activity:

1.21.7 The personal use of water

1.21.8 [LO 1.2]

Write down all the activities in which you use water during a single day. Compare it with what your classmates have written. Ask your parents to show you how the water meter at your house works.

1.21.9 The advantage of running water in the home [LO 3.2]

Study the pictures to help you to describe the ways in which running water in the home makes life easier.

²¹This content is available online at <<http://cnx.org/content/m20229/1.1/>>.

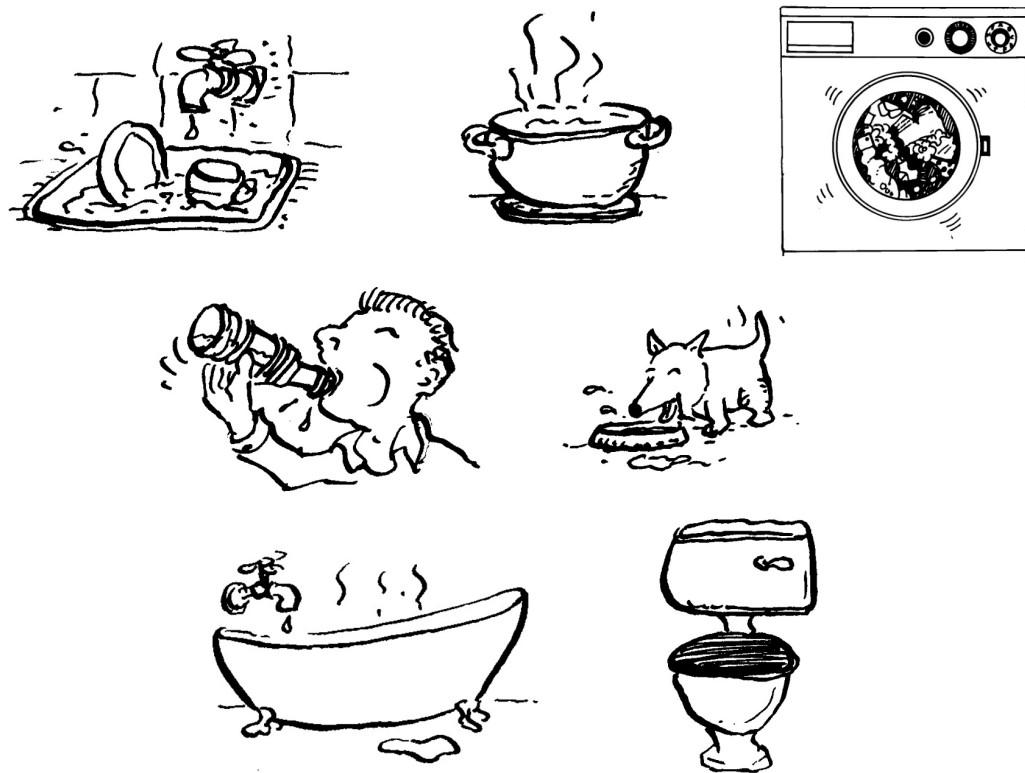


Figure 1.41

1.21.10 The uses of water

Paste appropriate pictures of water below each section.

1. For cooking food, for cleaning and drinking.
2. For cultivating food.
3. For transport and recreation.
4. For cleaning.
5. For plants and animals to live in.
6. For factories, industries and power stations.

Summative mark

1.21.11 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATION The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

1.21.12 ASSESSMENT STANDARDS: WE KNOW THIS WHEN THE LEARNER

- takes the lead in investigating and collecting data;

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

ASSESSMENT STANDARDS: WE KNOW THIS WHEN THE LEARNER

- understands the impact of Science and Technology.

1.21.13 Memorandum

The ways in which having running water in the home makes life easier.

- We can bath or shower without first having to fetch water.
- We do not have to fetch water to wash dishes.
- Having running water in the home saves time and energy.
- Laundry can be washed easily, our hands are not exposed to the chemicals in soap powders (if you have washing machine!)
- It is easier to keep everything clean and neat.
- We can have flush toilets, so we merely pull a chain and everything remains clean and free of germs.
- We merely have to turn the tap to be able to wash vegetables before eating or cooking them.
- We have drinking water available all the time.

It is easy to bath and take care of pets if we have clean water.

1.22 Conservation of water²²

1.22.1 NATURAL SCIENCES

1.22.2 Grade 4

1.22.3 Life and way of living

1.22.4 Module 22

1.22.5 Conservation of water

1.22.6 How people conserved water over time [LO 3.1]

Many people in our country do not have running water available in their homes. Find out what people in your vicinity have to do to get water for use in the home.

Over time, people have thought up a number of ways to conserve water safely.

Use the guiding words and refer to the illustrations to write proper sentences about this.

²²This content is available online at <<http://cnx.org/content/m19932/1.1/>>.



Figure 1.42

Tanks: rain water, roofs, gutters



Figure 1.43

Dams: cement, ground, irrigation

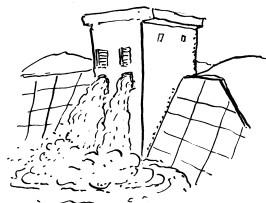


Figure 1.44

Municipal storage dams: towns, cities, water for drinking

People who do not have running water in their homes, have to devise ways of getting water. Sometimes they use river water, which they have to collect in buckets and carry to their homes. They also wash their clothes in the river.



Figure 1.45

Sometimes river water is stored in reservoirs. This is not necessarily safe as the water may contain dangerous substances. Therefore it is treated at a water purification plant where soil and plant particles are removed and chlorine is added to destroy germs.



Figure 1.46

Think of five ways to conserve water. Write your ideas here:

Design a bumper sticker with the slogan: Count every drop because every drop counts.



Figure 1.47

Remember to conserve water, but also to take care of your health by washing your hands before you eat and after you have used the toilet.

1.22.7 Assessment

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

ASSESSMENT STANDARDS: WE KNOW THIS WHEN THE LEARNER

- understands science and technology in the context of history and personal knowledge.

1.22.8 Memorandum

Conservation Of Water

Storage tanks: We can use tanks to catch rainwater that runs off the roof along the gutters when it rains.

Dams: Water can be collected and stored in cement or ground dams and used for irrigation.

Municipal storage dams: The water for towns and cities are supplied from these.

Ways to conserve water

- Prevent taps from leaking.
- Water the garden in the early morning or evening.
- Do not keep the tap running while you are brushing your teeth.
- Do not keep the tap running while you are washing your hands.
- Drink water from a glass, not from the tap or your hand.

Reduce the amount of water in which you bath, take a shorter shower.

1.23 Supply clean water to households²³

1.23.1 NATURAL SCIENCES

1.23.2 Grade 4

1.23.3 Life and way of living

1.23.4 Module 23

1.23.5 Supplying clean water to households

1.23.6 SUPPLYING CLEAN WATER TO HOUSEHOLDS

When we need water, we simply open the tap. Have you ever wondered where the water in the tap comes from ?



Figure 1.48

Let's take a trip with Walter Water Drop on his way to a tap.

²³This content is available online at <<http://cnx.org/content/m19933/1.1/>>.



Figure 1.49

Walter in the river on his way to the
From the storage dam, he travels along
to a municipal dam near a town or city.



Figure 1.50

- (a) Walter leaves the municipal dam through
a wide
and this pipe branches into
-



Figure 1.51

- (a) To help Walter on his way, you have to open the
-

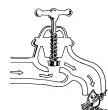


Figure 1.52

- (a) Explain why a tap that is closed might still drip and therefore waste water.
- (a) Try to give three reasons why a disabled person, an older person or young children may find it difficult to turn a tap.

Let's investigate:

Find out from where your town or city gets water.

1.23.6.1 Why are storage dams valuable? (Give two reasons)

Also find out which large storage dam is in your vicinity.

- (a) Which large storage dam is on the Orange River?
- (a) What kind of dam provides water to towns and cities?
- (a) Which large dam supplies water to Johannesburg?
- (a) What is used to catch rain water that runs off roofs?
- (a) Which dam is near Paarl?

1.23.7 Assessment

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

ASSESSMENT STANDARDS: WE KNOW THIS WHEN THE LEARNER

3.2 understands the impact of Science and Technology.

1.23.8 Memorandum

Distribution Of Water

Walter: Water Drop's trip to a tap

- Rain falls to the earth from the clouds
 - Storage dam
 - a pipeline
 - pipe ... narrower pipes
 - tap
 - A pipe can only leak from two places: from the rubber washer where the water flows out of the tap and from the packing where the flow is controlled.

 - The tap has not been closed properly
 - The washer may be cracked or be flattened
 - Grains of sand that damage the washer may have got into the casing of the tap.
 - If water leaks from the top of the tap, the nut on the upper turning shaft should be tightened.
- g) 1. Their hands may be too small or too weak

1. Taps used by the public in public places should have long handles that are easy to turn.
2. The tap might be closed unnecessarily tightly.

Let's investigate!

- Why are storage dams valuable? (two reasons)
- Water is available for domestic use at all times, even when rivers might run dry.
- We are able to water for irrigation.

- (a) Gariep Dam
- (b) Municipal storage dams
- (c) Vaal Dam
- (d) Storage tanks
- (e) Wemmershoek Dam

1.24 When water is dangerous²⁴

1.24.1 NATURAL SCIENCE

1.24.2 Grade 4

1.24.3 Life and way of living

1.24.4 Module 24

1.24.5 When water is dangerous

1.24.6 When might water be dangerous?

Use a red pencil crayon to circle examples of dangerous situations that involve water.

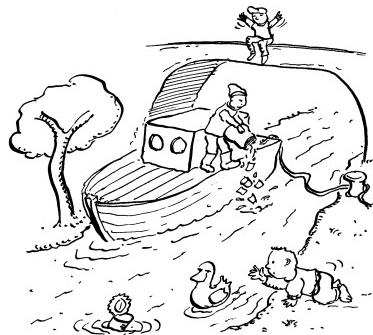


Figure 1.53

²⁴This content is available online at <<http://cnx.org/content/m19946/1.1/>>.



Figure 1.54



Figure 1.55



Figure 1.56



Figure 1.57



Figure 1.58



Figure 1.59



Figure 1.60



Figure 1.61



Figure 1.62



Figure 1.63

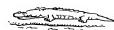


Figure 1.64



Figure 1.65



Figure 1.66



Figure 1.67



Figure 1.68



Figure 1.69



Figure 1.70



Figure 1.71



Table 1.6

1.24.7 Memorandum

When might water be dangerous?

Discuss the dangers that are evident in the picture after the learners have completed the assignment.

- When babies and toddlers bath in very hot water
- When babies and toddlers are left in the bath without supervision.
- Swimming pool dangers.
- A river may be too shallow for diving without you knowing it, and may contain germs.

- The water in a dam may be too shallow and contaminated (stagnant water).
- There may be sharks in the sea, or currents that can lead to drowning.
- Any spontaneous response from the class.

1. For cooking food, for cleaning and drinking

- A pot of food on the stove
- Washing a fruit in running water
- A child drinking water

2. For cultivating food

- Maize plants growing
- Fruit trees growing
- Cabbages in the field

3. For transport and recreation

- Yacht
- Jet ski
- Child angling

4. For cleaning

- Father washing car
- Washing dishes
- Washing hands after going to the toilet

5. For plants and animals to live in

- Ducks on a dam
- Crocodile at the water
- Dolphins swimming

6. For factories, industries and power stations

- Industries
- Power station
- Factories

Chapter 2

Term 2

2.1 Menaing of the word ENERGY¹

2.1.1 Natural Science

2.1.2 Grade 4

2.1.3 ENERGY AND CHANGE

2.1.4 Module 25

2.1.5 the meaning of the word ‘energy’

2.1.5.1 ENERGY AND CHANGE

What is the meaning of the word energy? If we consult a dictionary, it is defined as **the power to operate or act or the capacity of a body or system to do work.**

2.1.5.1.1 Activity:

2.1.5.1.2 To understand the meaning of the word “energy”

2.1.5.1.3 [LO 2.1]

The illustration below shows the manner in which we live nowadays. Discuss what you see and identify all examples of energy being used.

¹This content is available online at <<http://cnx.org/content/m20097/1.1/>>.



Figure 2.1

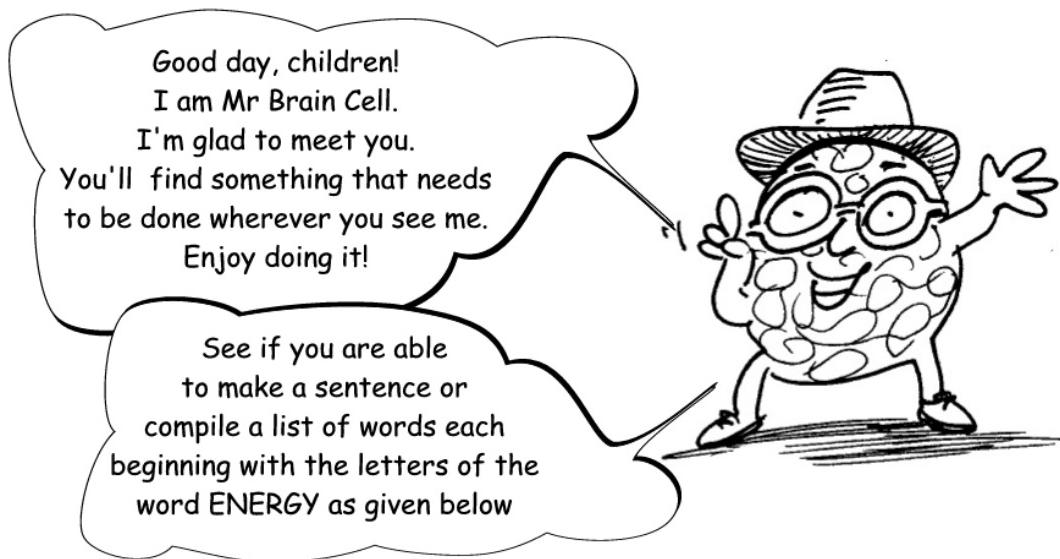


Figure 2.2

E
N
E
R
G
Y



Figure 2.3

Energy is the special power of your body to do work. If you work hard, you use much energy and need more. Sometimes you might not feel like getting out of bed in the morning, but at other times, you may feel that you have enough energy to climb a mountain.

Anything that works, even a machine, needs energy. People definitely need energy, even if it is to just stay alive.

There are many sources of energy in nature that can be used to do our work for us, but we need to realise that we will not have these sources forever. We therefore have to learn to use them with care. Many of the people in our country also do not have access to these sources of energy. Those of us who do have this should learn to regard it as a privilege and not as a right.

2.1.6 Assessment

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGE

The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner

2.1 recalls significant information.

2.1.7 Memorandum

THE MEANING OF THE WORD “ENERGY”

- Have a lively discussion about the picture. Let the learners discuss it in groups first and then let them give feedback to the rest of the class. Then talk about energy in general. Refer to the picture while the module is being done.

- First of all, before the assignment is done, have a general discussion on energy.
- Any acceptable answer is correct.

Energy is life.

Nothing can exist without energy.

In order to work, I need energy.

Ready for the day!

Enough get-up-and-go for the day.

Something I can do.

I need energy to participate in sport.

2.2 The sun as a source of energy²

2.2.1 NATURAL SCIENCES

2.2.2 Grade 4

2.2.3 ENERGY AND CHANGE

2.2.4 MODULE 26

2.2.5 THE SUN AS A SOURCE OF ENERGY FOR LIFE ON EARTH

2.2.5.1 Activity

2.2.5.2 To describe the sun as a source of energy [LO 2.1]

The sun, naturally, is our most important source of energy. People accept the sun as a matter of fact, because we see it rising every morning, and at night we see it setting. The sun radiates its energy in all directions all over the earth. The sun warms up the earth and, in this manner, supplies it with energy. Plants use some of this energy to grow and when animals eat the plants they also obtain some of the energy, so that they can use it to move around and to grow.

²This content is available online at <<http://cnx.org/content/m20099/1.1/>>.

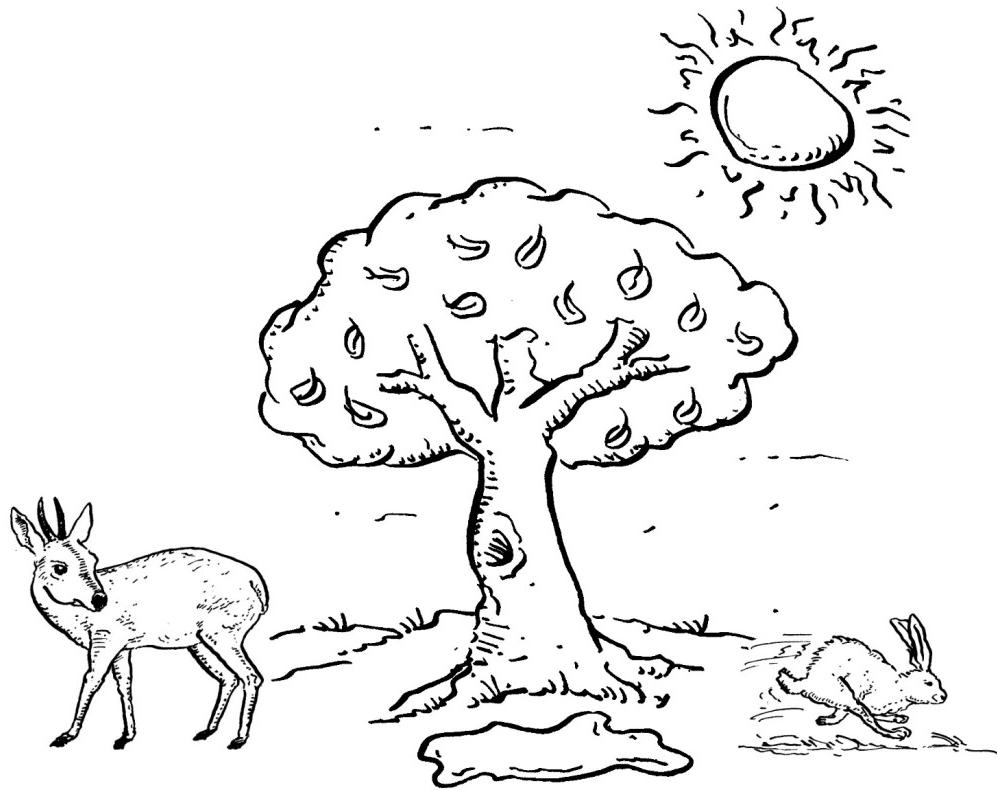


Figure 2.4

Where do people obtain energy?

Write a short sentence to explain what happens in each picture. Write your explanations neatly in the spaces provided below the pictures.



Figure 2.5

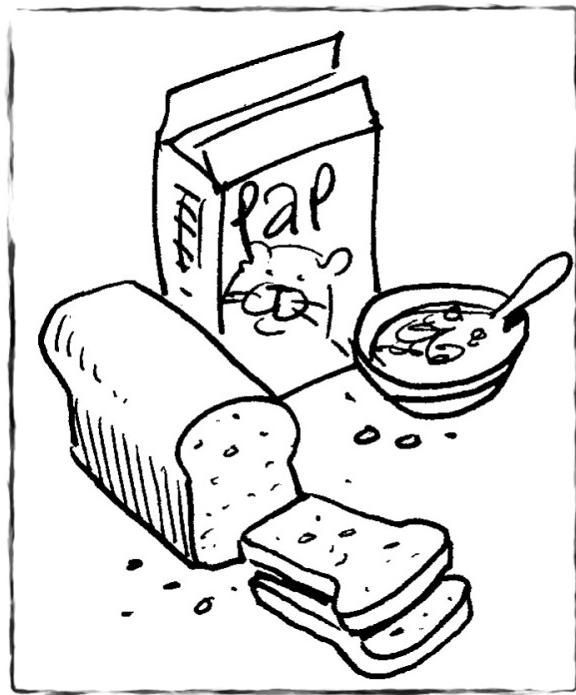


Figure 2.6

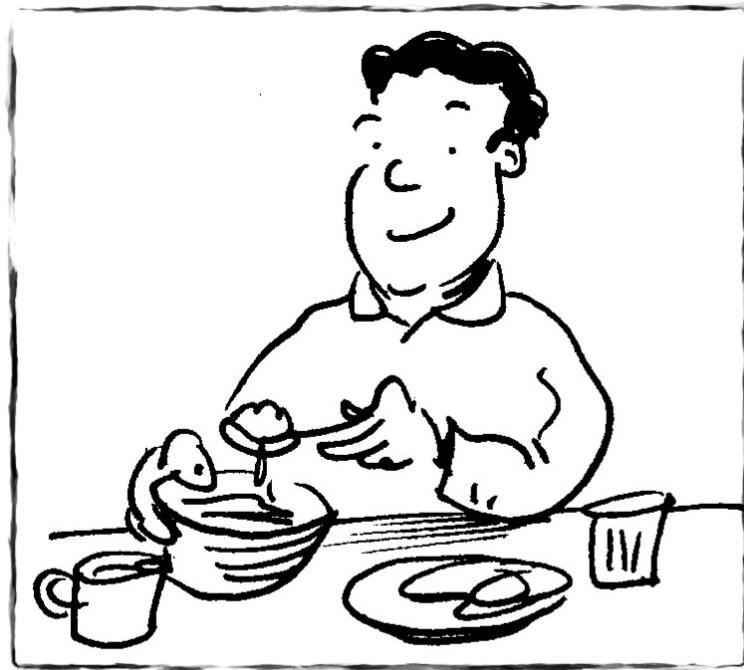


Figure 2.7



Figure 2.8

According to the above information, energy has been transferred from the sun to the wheat plant and then to Philip's body. This transfer signifies exactly the same as your action when you share your lunch with your friend during break: You give it to him or to her.

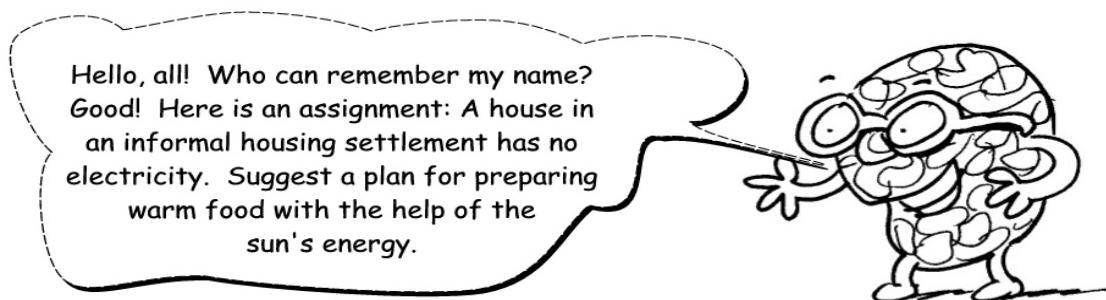


Figure 2.9

2.2.6 Assessment

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGE

The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner

2.1 recalls significant information.

2.2.7 Memorandum

SENTENCES THAT MATCH THE PICTURE

- The sun gives energy to the wheat plant, which then stores the energy.
- The bread and porridge now contain the energy from the wheat.
- Now Phillip's body absorbs the energy.
- He uses energy when he practices.

HOW TO COOK FOOD BY USING SOLAR ENERGY

- Take a polystyrene cup; line it with plastic and place food in it.
- Cover the top of the cup with some plastic and fasten the cover securely with an elastic band.
- Take a sheet of A4 paper or light cardboard and cover one side with aluminium foil, shape it into a cone and place it around the cup with the aluminium foil on the inside. Trim it neatly.
- Place the cup with the cone in another polystyrene cup and place it in a container so that it will stay upright. One can put newspaper around it to keep it firm.
- Now place it in a sunny spot, and make sure that the “oven” faces the sun.
- Leave it like this until the food is cooked. Move the “pot” so that it is always in the sun.

2.3 The dangers of sunburn³

2.3.1 NATURAL SCIENCES

2.3.2 Grade 4

2.3.3 ENERGY AND CHANGE

2.3.4 Module 27

2.3.5 THE DANGER OF SUNBURN

2.3.5.1 Activity:

2.3.5.2 To point out the danger of sunburn

2.3.5.3 [LO 2.1]

List as many examples as you can of ways in which the sun is used.

³This content is available online at <<http://cnx.org/content/m20101/1.1/>>.



Figure 2.10

Conduct a group discussion on the damage that the sun can do to your skin and then complete the tasks:

1. If you spend too much time in the sun without taking any precautions, the following may happen:
1. Think about what you could do to protect yourself against the sun. Cut relevant advertisements from old magazines and paste them on a sheet of paper.



Figure 2.11

3. Why do you think some people still spend time lying in the sun to become tanned?
 1. Write a letter to the principal of your school in which you offer suggestions for protecting the learners at the school against sunburn. Ask your educator to hand these letters to the principal.

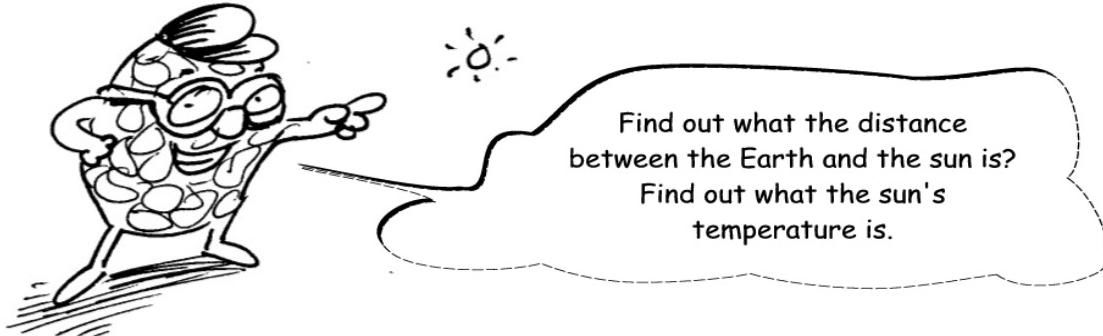


Figure 2.12

2.3.6 Assessment

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGE

The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner
2.1 recalls significant information.

2.3.7 Memorandum

Write down as many uses for the sun as possible.

- The sun provides energy for humans, plants and animals.
- The sun heats the earth.
- The sun provides light for the earth.
- The sun keeps us warm.
- The sun helps plants to grow.
- Any other acceptable answer.

Hold a group discussion on the damage that the sun can cause to your skin, and then complete the following activities:

1. One's skin can be burnt very badly by the sun. It can be so severe that blisters can form.
2. Learners cut out pictures and paste them in the spaces provided. They can even bring real products that can be discussed in class.
3. Models who are used in advertisements are always depicted as being beautifully tanned. This puts pressure on ordinary people to try to look like them. (Here one could discuss peer pressure in general.) Any acceptable answer.
4. Let the learners write short letters to give to the principal. Interesting things should come out of this exercise.

MR BRAIN CELL

- Approximately 150 million km from earth.
- Temperature 15 million degrees Celsius.

2.4 Making energy available to people⁴

2.4.1 NATURAL SCIENCES

2.4.2 Grade 4

2.4.3 ENERGY AND CHANGE

2.4.4 Module 28

2.4.5 MAKING ENERGY AVAILABLE TO PEOPLE

MAKING ENERGY AVAILABLE TO PEOPLE

Energy from sunlight is stored in and around the earth in several ways. (In some instances temporarily, as when the earth is warmed by the sun, or for longer periods of time, for instance when it is fixed in food). The stored energy can be released later and be used.

Let us take a look at some of the means by which it may be released

2.4.5.1 Activity:

2.4.5.2 Using wind as a source of energy to our advantage

2.4.5.3 [LO 1.1, 1.2, 1.3, 2.1]

See how many of the following idiomatic expressions that have developed around the idea of wind are known to you?

- We got wind that you were coming (we were given a hint)
- His talk was all wind (it was insubstantial)
- Between wind and water (a vulnerable spot, as the part of a ship that is normally below water but is exposed when the ship rolls)
- How the wind blows (what appears probable)
- In the wind (about to happen)
- Three sheets in the wind (intoxicated or drunk)
- Sail close to the wind (come near the limits of danger)
- Take the wind out of someone's sails (destroy someone's advantage)

What is wind?

Blow on your hand. What do you notice?

⁴This content is available online at <<http://cnx.org/content/m20103/1.1/>>.



Figure 2.13

We cannot see the wind, but we can feel it when it blows against our faces or ruffles our hair. Washing dries quickly if it is hung out in the wind.

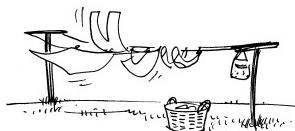


Figure 2.14

Do you know the reason for this?

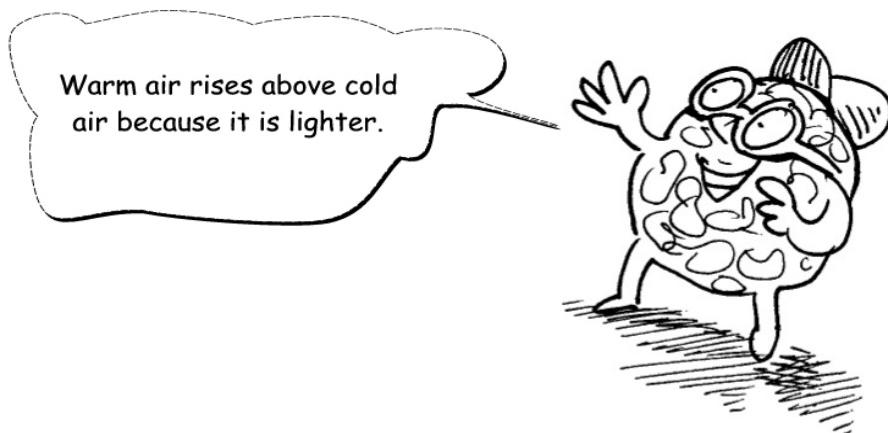


Figure 2.15

How does wind occur?

Complete the sentences to explain the illustration by supplying the missing words:



Figure 2.16

1. By day the sun . It .

the land.

1. Warm air .
2. Cooler air moves from the to the

to take the place of the warm air.

1. This is how originates.

Make a windmill

- Use stiff paper. Cut it according to the instructions on the illustrations.
- Will this windmill turn in a room where there is no wind?
- What could you do to make it turn?
- Discuss suggestions about how to increase the windmill's turning speed with your friends and report your ideas to the class.

Folding a small paper glider:

- Fold a sheet of A4 paper in half lengthways.
- Unfold the sheet of paper and fold the two top corners to the central fold so that the top edges lie together.
- Fold the new corners to the central fold, forming a sharp arrow point.
- Fold back the arrow point to the point at which the other points meet.
- Fold along the original lengthways fold again to "close" the structure.
- Fold the bottom corners separately to form wings.
- Fold back both wings along a line lying parallel to the central fold.
- Hold below and throw gently, noting how far the glider glides!
- You may experiment to see which folding pattern allows the glider to glide better. Demonstrate this to the class and motivate your explanation.

Ways in which wind is used to the benefit of people

People have always made use of the power of wind to achieve things.

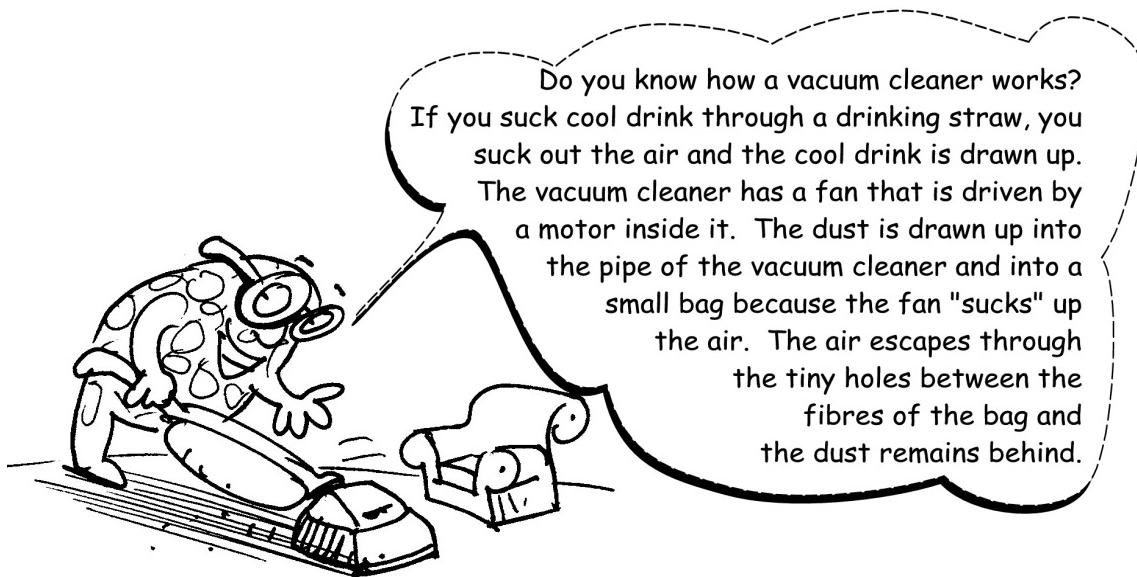


Figure 2.17

People have used the wind to their advantage. Sailors use the power of the wind that blows against their sails to drive their ships.



Figure 2.18

Windmills have been used to grind wheat and wind pumps pump water from below the ground.



Figure 2.19

The wind blows against the sails of the mill or the vanes of the wind pump to turn them. This turning turns machinery inside the mill. Modern windmills are called turbines and are used to provide electricity.

Class project

Let's build a kite! First name and describe the materials that we could use for this project. Then form groups to build kites.

2.4.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATION The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

1.1 plans investigations;

- leads investigations and collects data;
- evaluates data and provides feedback on observations.

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGE

The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard
We know this when the learner
2.1 recalls significant information.

2.4.7 Memorandum

What is wind?

I feel air on my hand.

The wind shakes drops of water from the washing. The vapour from the washing disappears into the air.
Where does the wind come from?

Complete the sentences by using the missing words in order to explain the illustration:

1. shines, warm
2. rises
3. sea, land
4. wind

Make a windmill

Use a sheet of firm paper. Fold it according to the instructions on the illustrations.

Does a windmill turn in a room where there is no air current (wind)? No!

What can you do to make it turn? I can run while holding it in the air.

2.5 Wind as a source of energy⁵

2.5.1 NATURAL SCIENCES

2.5.2 Grade 4

2.5.3 ENERGY AND CHANGE

2.5.4 Module 29

2.5.5 WIND AS A SOURCE OF ENERGY

2.5.5.1 Activity:

2.5.5.2 To talk about wind as an enjoyable source of energy

2.5.5.3 [LO 3.2]

Being out of doors on a windy day can make us feel energetic. There are many ways in which we can enjoy the wind.

Form groups and take a minute to think about the nicest way in which one could enjoy the wind.

When groups report back, decide which idea will be the cheapest to follow, and which will be the most expensive.

Which group's idea will require the least effort, and which will require the most effort?

Write labels for the following pictures.

⁵This content is available online at <<http://cnx.org/content/m20104/1.1/>>.

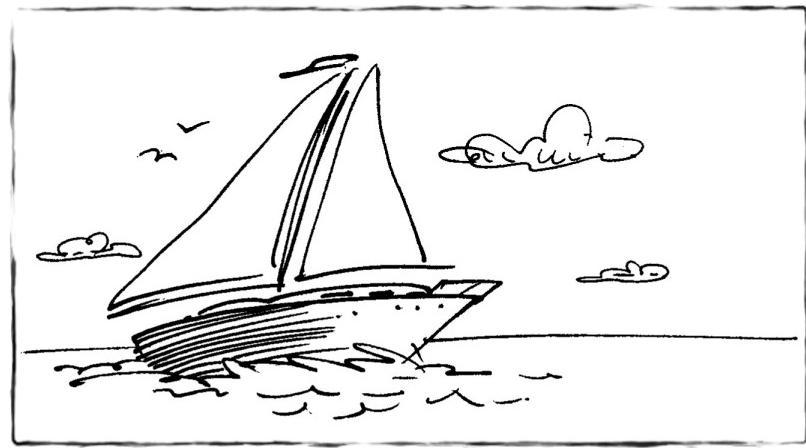


Figure 2.20

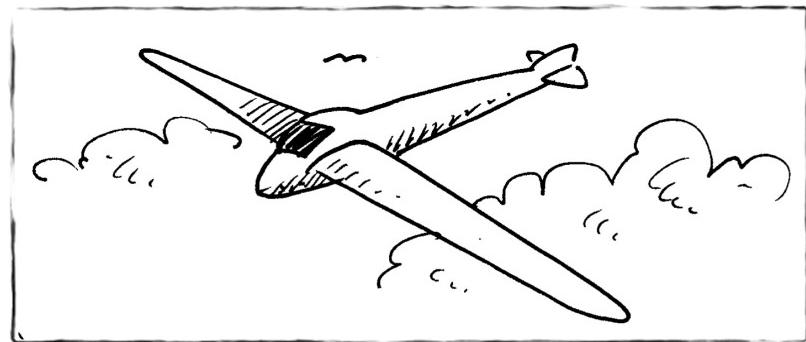


Figure 2.21

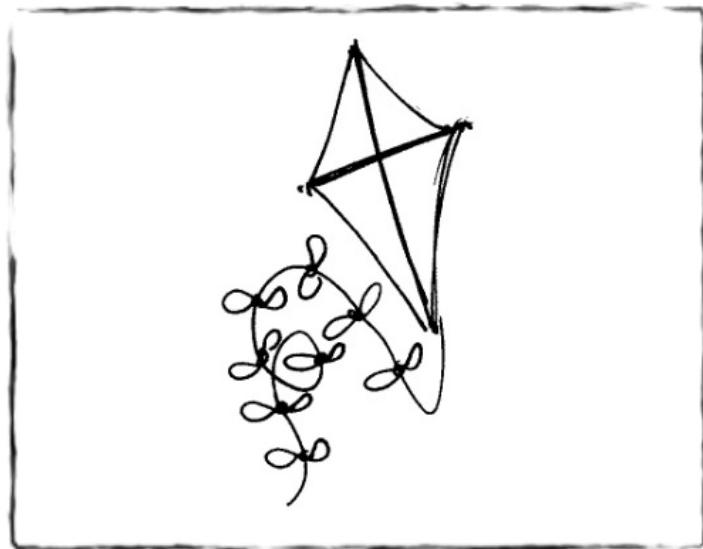


Figure 2.22

2.5.6 IDENTIFYING OTHER USES OF WIND [LO 1.3]

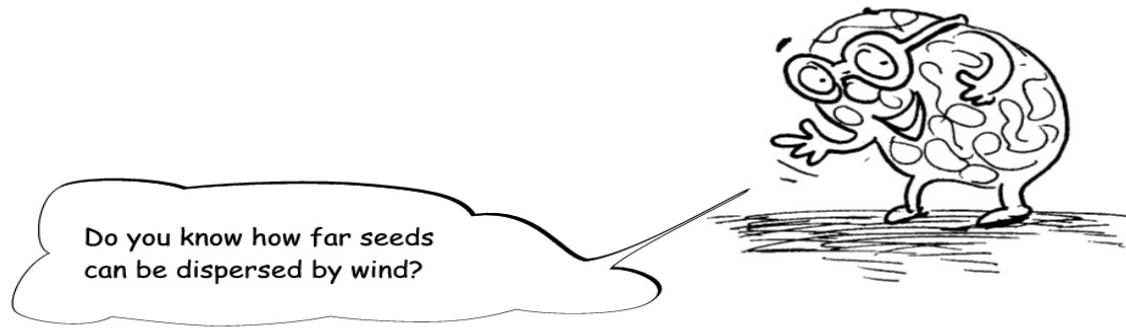


Figure 2.23

Plants also make use of the wind!

Wind disperses the seeds of plants and trees. Plants that use the wind in this way have very light seeds. Interesting facts: Some seeds have wings that help them to “fly”. Other seeds glide like parachutes.

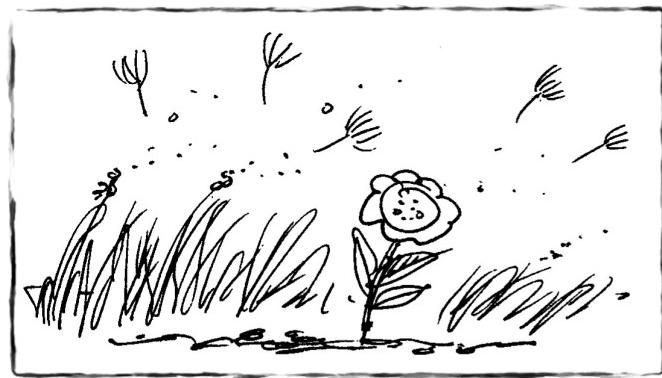


Figure 2.24

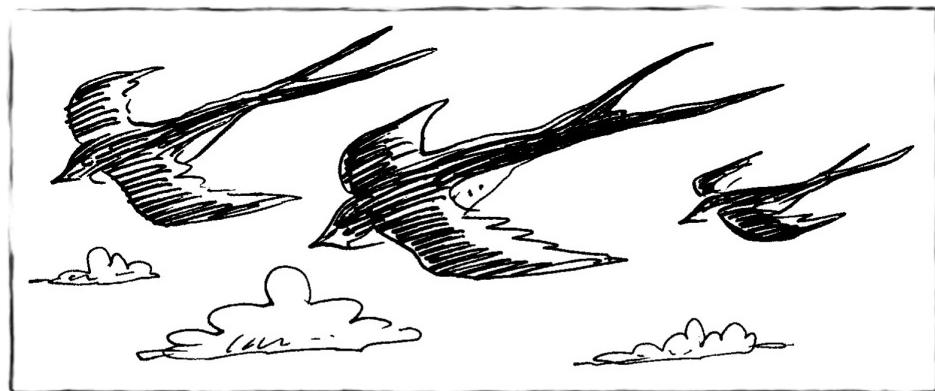


Figure 2.25

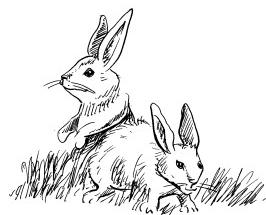


Figure 2.26

The feathers of birds help them to glide on the wind. If the wind is strong, birds are assisted to fly for hundreds of kilometres when they migrate to other countries.

Some animals, rabbits for instance, sniff the air when they are eating. Because the wind carries the smell of their enemies, they are warned of danger.

The pilot of an aeroplane depends on the windsock at the airport so that he or she can determine from which direction for taking off or landing. The windsock also indicates the direction of the wind.

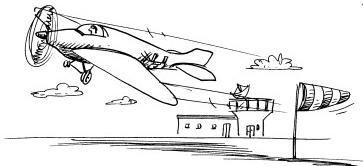


Figure 2.27

2.5.7 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONS The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

2.5.7.1 Assessment Standard

We know this when the learner

- evaluates data and provides feedback on observations.

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT

2.5.7.2 Assessment Standard

We know this when the learner

- understands the impact of Science and Technology.

2.5.8 Memorandum

If one is out of doors on a windy day, one can feel very energetic. There are many ways in which one can enjoy the wind.

- Write captions to the following pictures.

One can participate in water sports.

One can fly in a glider!

One can fly a kite.

Let us think of conditions when the wind could be dangerous

1. Trees can be uprooted, they can destroy motor cars and houses, roads can be blocked, power lines can be blown down and homes can be left without electricity.

2. Storms at sea can cause flooding on land, and ships can be wrecked.

3. Tornadoes are the strongest kind of wind-storms and can have a velocity (speed) of up to 300 km per hour. A tornado can cause incredible damage.
4. Wind can cause soil erosion. Think of ways in which it can be prevented.
5. If the wind blows from one direction all the time, trees can grow skew. How can we live safely in such conditions?
6. If a veld fire occurs, wind can make it worse and massive plantations can be destroyed.
7. Breakwaters can be built along the coast to prevent the water from flooding the land.
8. Some animals live safely in their underground tunnels.
9. In dangerous places bridges and roads are closed temporarily so that motorists will not travel there.
10. Rows of trees and hedges can be planted along cultivated fields to prevent the crops from being damaged.

2.6 Fire as a source of energy⁶

2.6.1 NATURAL SCIENCES

2.6.2 Grade 4

2.6.3 ENERGY AND CHANGE

2.6.4 Module 30

2.6.5 FIRE AS A SOURCE OF ENERGY

2.6.5.1 Activity:

2.6.5.2 To talk about ways fire is/has been used as source of energy

2.6.5.3 [LO 3.1, 3.2]

People discovered how to make fire very long ago. At first they used sticks found in the veld and rubbed these together long and hard, to make them warm. (You can do this to feel how warm they become.) When really hot, a spark would be generated and this could ignite dry leaves and grass. You can also feel the heat that is generated when you rub your hands together. Such rubbing is known as creating friction.

How could fire be used to help people?

Draw some pictures to show this. Add labels to explain your pictures.

⁶This content is available online at <<http://cnx.org/content/m20106/1.1/>>.

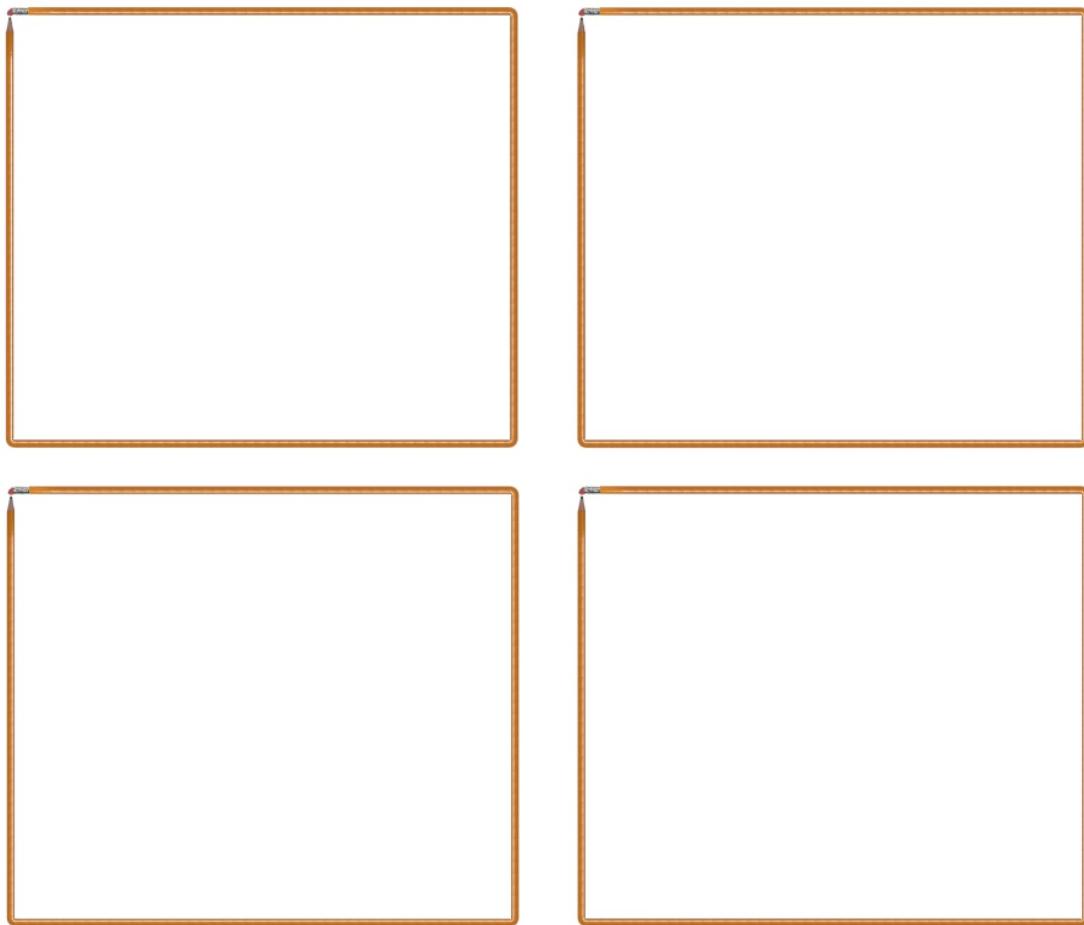


Figure 2.28



Figure 2.29

Fire is still used for preparing food nowadays, and in enjoying time spent with friends. Think of how pleasant it is to chat around the fireside in the Kruger Game Reserve, or at home when you have a braai.

Some people also use fire for keeping warm, and when we are camping all of us do this.



Figure 2.30

Some of the inhabitants of our country have nothing except fire for keeping warm in winter, because they have no electricity in their homes.

Discuss the picture with the help of the questions that follow:

- What do we call this source of energy and where can it be found?
- Why does a woman carry it? Where are the men?
- Name all the uses of this energy source?

Do you think it is safe for this woman to be looking for it?

- What are the disadvantages of this energy source, especially with regard to nature?
-

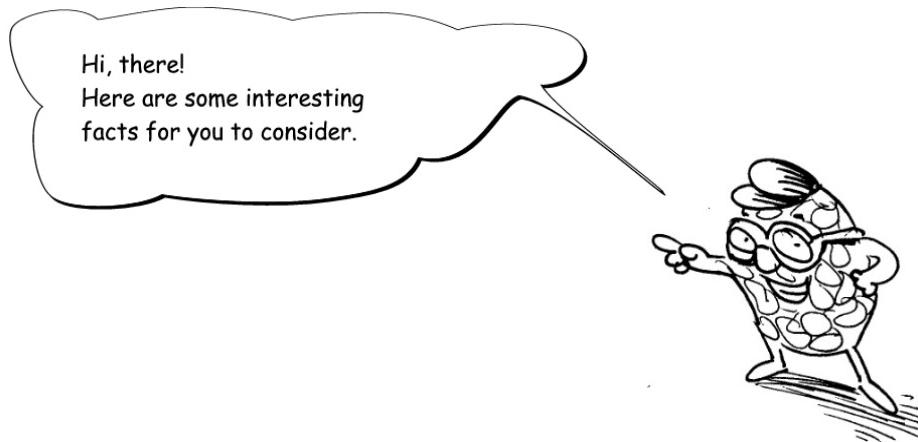


Figure 2.31

Imagine camping out. You are exhausted by the end of the day and would really like to have a cup of steamy soup. You do have soup, matches and a pot. You can pick up enough wood and twigs around the campsite.

When you make your fire, warm the soup and drink it, a scientific process takes place. When you lit the fire to burn the wood, chemical energy was changed into heat energy. The heat energy boiled the soup. When you ate the soup, your body changed the chemical energy in the soup to potential energy. Then your body changed it into kinetic energy (energy for movement) that is useful on a camping expedition. Your body changes energy. Some of the chemical energy that you obtain through food is changed into potential energy and then into kinetic energy. Some of the chemical energy is changed into heat energy to keep your body warm.

Fire is dangerous. Watch out!

Fire can also be very dangerous. You always have to take care when you use fire. We often read about or hear TV reports of people burning to death in their homes. Read the following news report:



Figure 2.32

Three young children were burnt to death in their hut over the weekend while their parents were at work. Bystanders and neighbours arrived too late to save the children who were calling out incessantly. They were trapped inside the hut by flames that had quickly spread through the whole hut. A strong breeze spread the fire through the neighbourhood and a further 25 huts were burnt to the ground.

Firemen who tried to stop the blaze discovered that the children had made a fire in a brazier, which presumably toppled over while they were playing around it and caused the damage.



Figure 2.33

Listen to the lesson to know which of the words in the list must go into the spaces in the sentences that follow below

(Word list: Copper, non-conductors, rubber, good, conductor, wood, steel, iron, plastics)

1. A material that allows heat to pass through is known as a .

1. Metals like , and

are heat conductors.

1. Other materials, like ,

and some are poor conductors and are known as



Figure 2.34

Non-conductors are valuable materials in many respects. Handles of pots and pans are made from non-conductors, so that our hands won't get burnt when we are preparing food. Firemen wear special clothes that are made of non-conducting materials. This keeps fire from getting to their bodies.

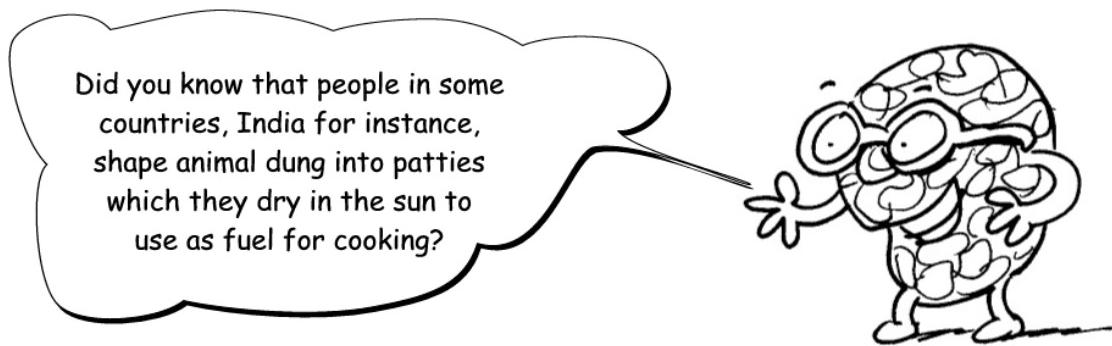


Figure 2.35



Figure 2.36

Most of the energy obtained from fire is heat energy that becomes available when we burn fuel. The first fuel was wood, but burning coal provides a much warmer flame.

Fire was also used to melt wax to make candles, and to light oil lamps and torches.

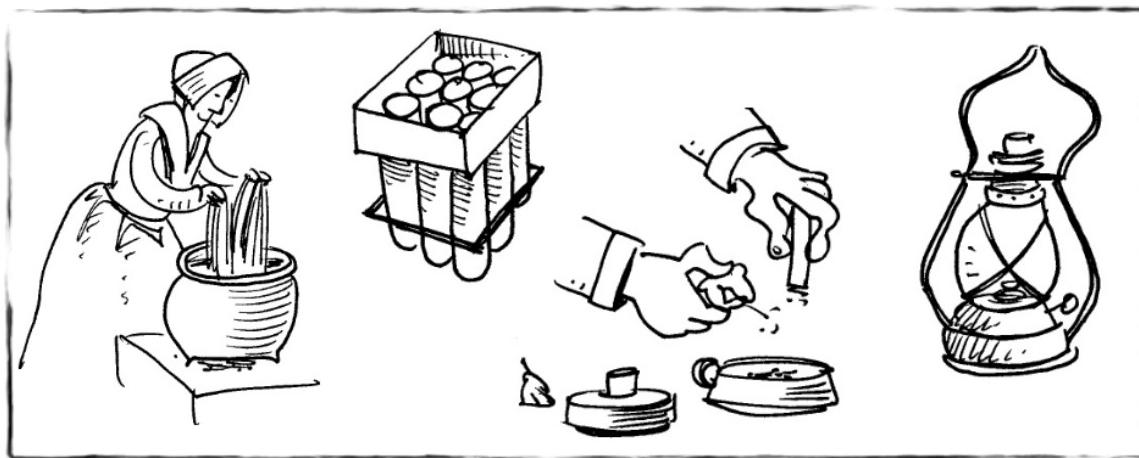


Figure 2.37

When matches were discovered, the lives of people were made more comfortable. Why?
Paste a match into the space below.



Figure 2.38

2.6.6 Assessment

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

We know this when the learner

- understands science and technology in the context of history and personal knowledge;
- 3.2 understands the impact of Science and Technology.

2.6.7 Memorandum

FIRE AS A SOURCE OF ENERGY

Discuss the picture with reference to the following questions:

- What is this source of energy called and where must one find it? We call it wood and we look for it in forests and in the veld.
- Why is a woman carrying it? Where are the men? In some cultures it is traditional for the women to gather the wood and carry it home, while the men tend the cattle.
- What can one do with this source of energy? Name all the uses you can think of. Any acceptable answer.
- Do you think it is safe for this woman to gather wood? No, there can be many dangers, such as snakes, wild animals, and thugs lurking in the woods.
- What are the disadvantages of this method, especially with reference to nature? It destroys our trees. Trees are damaged when branches are cut down.

Missing words

Materials that conduct heat are called conductors. Metals such as iron, steel and copper are good heat conductors. Other materials such as rubber, wood and some plastics are poor heat conductors. They are called non-conductors.

Non-conductors are valuable materials. The handles of pots and pans are made from these materials, so that we do not burn our hands when we prepare food. Fire fighters also wear special clothing made from these materials. It prevents the fire from touching their bodies.

2.7 Food as a source of energy⁷

2.7.1 NATURAL SCIENCES

2.7.2 Grade 4

2.7.3 ENERGY AND CHANGE

2.7.4 Module 31

2.7.5 FOOD AS A SOURCE OF ENERGY

2.7.5.1 Activity:

2.7.5.2 To discuss and describe food as a source of energy

2.7.5.3 [LO 1.1, 1.2, 1.3]

We have to take in food to obtain energy, and eat enough to keep going for long enough. If we do not eat enough, our bodies will not remain warm and we will not have enough energy to do our daily work. To remain healthy, we have to follow a balanced diet. It is possible to know whether you eat correctly and get enough to eat by studying the information on the boxes, packets, bags and tins in which food is bought to find out how much energy per volume is contained in the foodstuff. The quantity that is eaten is measured in kilojoules.

Some of the energy that animals obtain from the food that they eat is stored in their muscles. Those muscles are able to use the energy to do work.

In early times, people used the energy of their own muscles to do work, like gathering food, tilling their fields and building shelters. They made simple implements to help them use this energy more efficiently and

⁷This content is available online at <<http://cnx.org/content/m20107/1.1/>>.

to work better. The first tools were made of wood and stone, but when people discovered how to melt down metals, they used metal to make better and stronger tools.

They also discovered that they could use animals to work faster and better and get more work done, as one ox is able to do the work of eight grown men.

Animals were used to transport people and goods, to pull the ploughs in the fields and to pump water from below the ground to irrigate the fields.

Work out a balanced diet by examining the labels on different containers in which food is packed.

- Learners must be divided into three groups: Group 1 must determine the kilojoules value of breakfast; Group 2 the kilojoules value of lunch; and Group 3 the kilojoules value of supper.
- Each group must then report their findings concerning the value of the specific meal with regard to the energy requirement for the day.

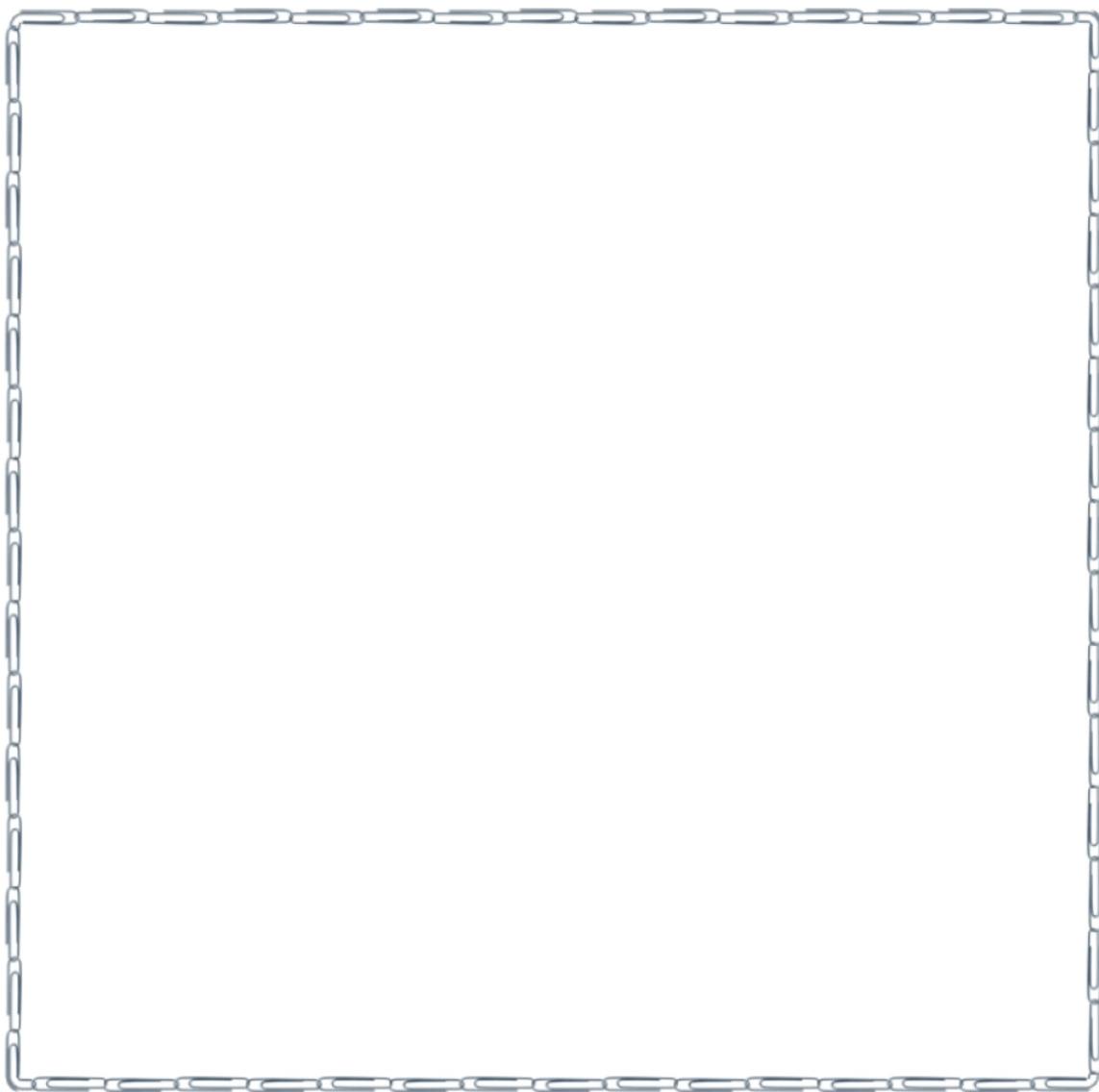


Figure 2.39

2.7.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONS

The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

- plans investigations;
- leads investigations and collects data;

- evaluates data and provides feedback on observations.

2.7.7 Memorandum

FOOD AS A SOURCE OF ENERGY

This assignment involves research. Help the learners to plan their research, to collect information, to draw conclusions and to communicate their findings.

2.8 Man's use of electricity⁸

2.8.1 NATURAL SCIENCES

2.8.2 Grade 4

2.8.3 ENERGY AND CHANGE

2.8.4 Module 32

2.8.5 MAN'S USE OF ELECTRICAL ENERGY

2.8.5.1 Activity:

2.8.5.2 To investigate man's use of electrical energy

2.8.5.3 [LO 1.2, 1.3, 2.2]

In our own country, South Africa

We get electricity from power stations that supply power to the whole country. The electricity supply of each town or city depends on the size of the area, the number of houses, the number of factories and the number of people.

Find pictures to represent the uses of electricity in your town or city. Paste the pictures in the space provided below.

⁸This content is available online at <<http://cnx.org/content/m20108/1.1/>>.



Figure 2.40

Write a short sentence on the use of electricity in the following places: Describe how the people who belong to your culture found safe ways of using electricity in years gone by.

On farms

In factories:

In mining areas:

In our community:

List the situations in which electricity is used in our community.

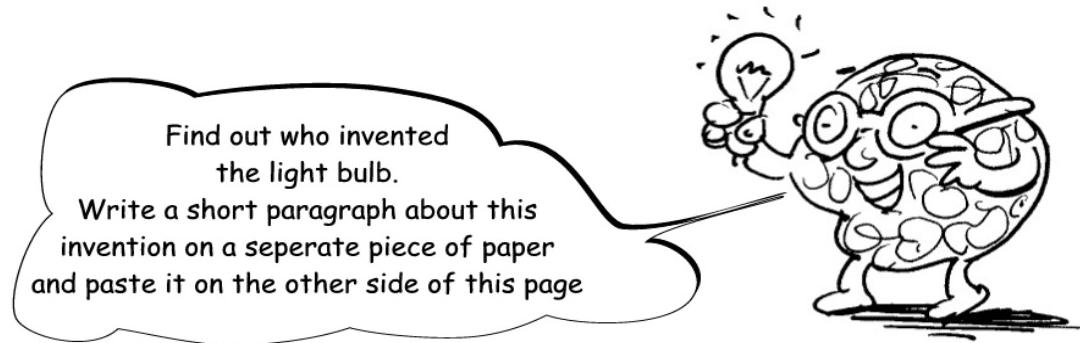


Figure 2.41

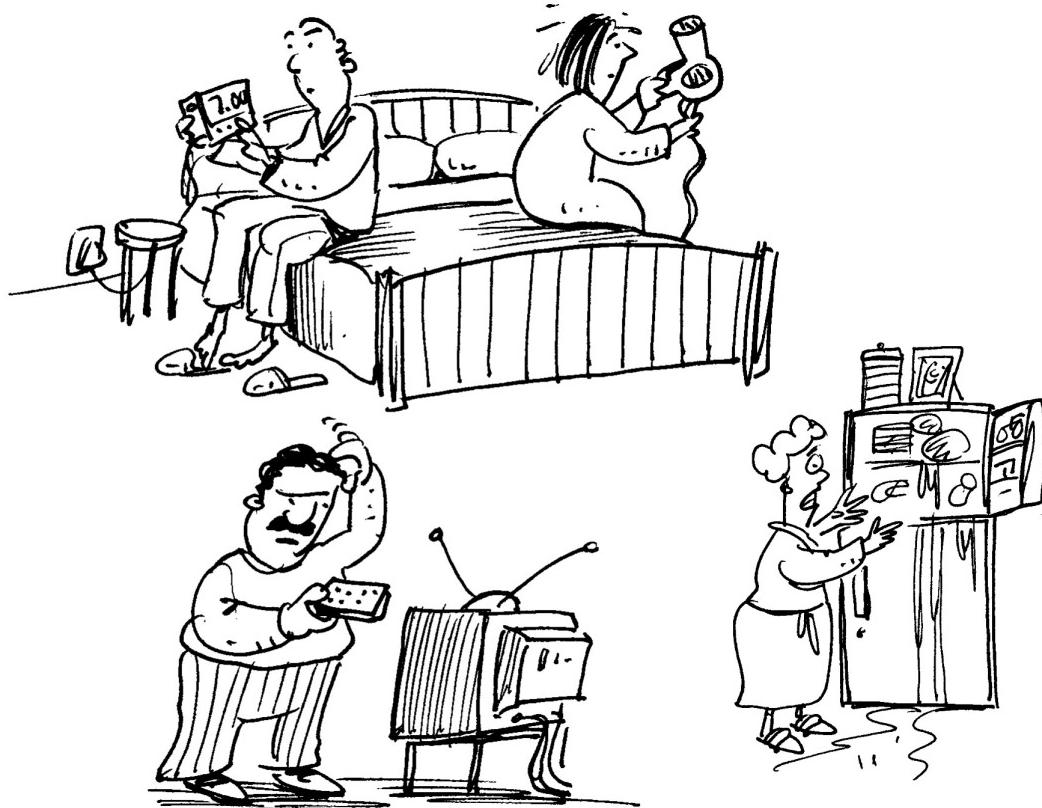


Figure 2.42

Three assignments follow. Choose one and act out the event of your choice.
There is a power failure at your school. Show through your acting how it affects

1. you?
2. your educator?
3. the caretaker?
4. the secretary?
5. the principal?

Some schools in our country have no electricity. How do you think the staff and learners manage to do the schoolwork?

There is a power failure at the hospital. Show through your acting how it affects

1. the patient?
2. the doctor and nursing staff?
3. the kitchen?
4. the theatre?

There is a power failure at the supermarket. Show through your acting how it affects

1. the clientele?
2. the manager?
3. the cash register?
4. the bakery section?
5. the meat section?
6. the cooling system/fridges?

2.8.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONS

The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

1.2 leads investigations and collects data;

- evaluates data and provides feedback on observations.

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGE The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner

2.2 categorises information.

2.8.7 Memorandum

In our country, South Africa

Write a short sentence on the utilization (use) of energy in the following places. (The learners must write their own sentences according to their cultural group, to indicate how safe methods of using energy have been found throughout the past years. These sentences are merely guidelines.)

On farms:

A farmer uses electricity to save time, energy and money, but then he might not need so many workers.

In factories:

Factories cannot run without electricity. The machines that make products work for very long hours.

In mining areas:

Machines that are used in mines use electricity. This saves time and makes the miners' work easier.

In our community

Make a list of where we use electricity in our community.

- Homes
- Supermarkets
- Chemist shops
- Hospitals
- Streets
- Shopping centres
- Churches
- Any other acceptable answers

2.9 Saving electricity⁹

2.9.1 NATURAL SCIENCES

2.9.2 Grade 4

2.9.3 ENERGY AND CHANGE

2.9.4 Module 33

2.9.5 SAVING ELECTRICITY

2.9.5.1

2.9.5.2 Activity:

2.9.5.3 To discuss ways of saving electricity

2.9.5.4 [LO 3.2]

Bring old electricity accounts from your homes to school and discuss them. See how the amounts on the accounts vary from month to month, from winter to summer and from house to house.

Discuss suggestions on how to economize on the use of electricity at home. Share your ideas with you parents when you are at home.

How to save electricity

Examine the pictures below. Indicate where you agree by placing a tick in the appropriate place and indicate where you disagree by placing a cross in the appropriate place.



Figure 2.43

Do not put warm food or fluids in the fridge.



Figure 2.44

Do not boil water in a pot on the stove – rather use the kettle.

⁹This content is available online at <<http://cnx.org/content/m20109/1.1/>>.



Figure 2.45

Do not use a pot with an uneven bottom, because it requires more heat.



Figure 2.46

Do not use a big stove-plate to heat up a small pot or saucepan – unused heat is wasted.



Figure 2.47

Do not use the stove as a heater – a heater works cheaper.

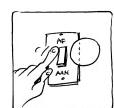


Figure 2.48

Switch off lights when they are not necessary.



Figure 2.49

Do not use more than necessary warm water to bath.



Figure 2.50

You use less water when you shower than when you bath.



Figure 2.51

Use cold water to do your washing.

REMEMBER: you pay for the electricity that you waste!

Select a room in your home. Look through old magazines to find and cut out pictures of the appliances that you use most frequently in that room. Advertisements from furniture stores will also be handy for this. Paste the pictures in the space below.

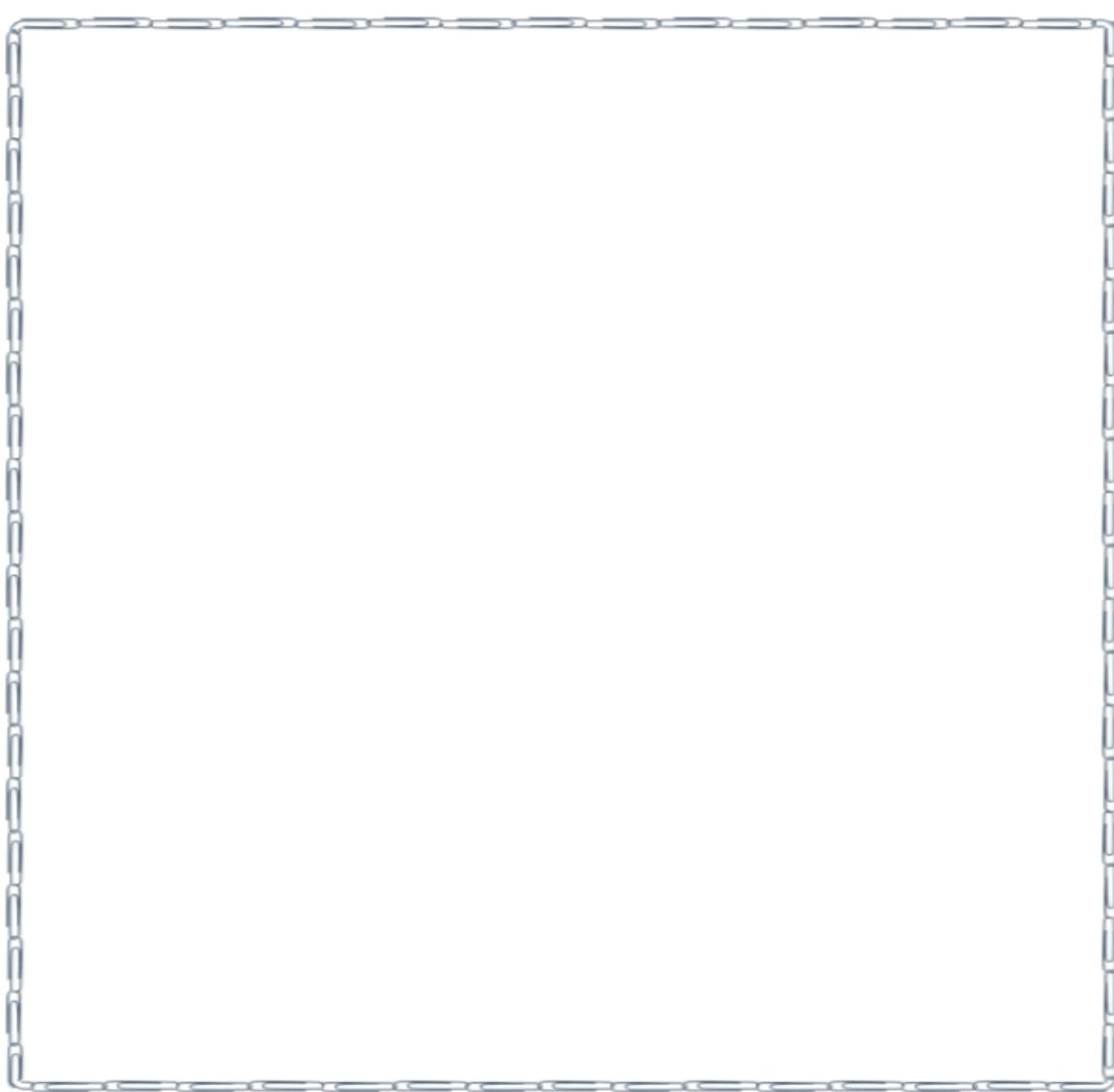


Figure 2.52

2.9.6 Assessment

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

We know this when the learner

3.2 understands the impact of Science and Technology.

2.9.7 Memorandum

How to conserve (save) electricity:

- It is wrong to put warm food in the refrigerator.
- Boiling water in a saucepan is wrong; in a kettle is correct.
- A warped saucepan is wrong; a level (flat) base is correct.
- A small saucepan on a large plate is wrong; a small saucepan on a small plate is correct.
- A stove as a heater is wrong; a proper heater is correct.
- To switch off unnecessary lights is correct.
- Too much water in a bath is wrong.
- Having a shower is correct.
- Hot water for washing is wrong.

2.10 Making a simple electric switch¹⁰

2.10.1 NATURAL SCIENCES

2.10.2 Grade 4

2.10.3 ENERGY AND CHANGE

2.10.4 Module 34

2.10.5 MAKING A SIMPLE ELECTRIC SWITCH

2.10.5.1 Activity:

2.10.5.2 To make a simple electric switch

2.10.5.3 [LO 3.2]

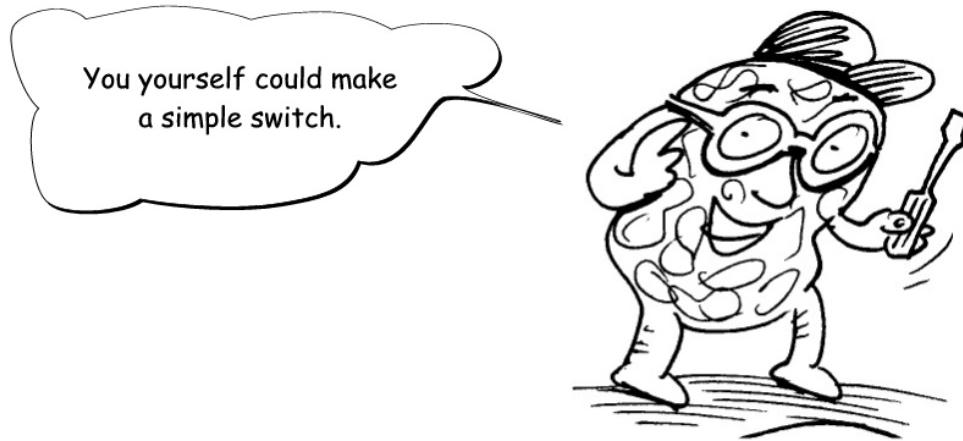


Figure 2.53

You will need:

- A small block of wood: 8 cm x 4 cm x 1cm
- A paper clip
- Two drawing pins
- Three 25 cm lengths of plastic-coated wire
- A 4,5 volt light bulb in a socket
- A 4,5 volt battery
- A screwdriver

1. Attach a length of wire to each drawing pin. Push one drawing pin into the flat surface of the wooden block. Push the second drawing pin through the eye of the paper clip and also into the block of wood. The two drawing pins should be approximately 1 cm apart.

¹⁰This content is available online at <<http://cnx.org/content/m20112/1.1/>>.

2. Be sure to keep the paper clip in position with the drawing pin, but in such a manner that it can be swivelled to touch the second drawing pin. This is the switch.
3. Test the switch by attaching the free end of the one length of wire to one end of the battery and connecting the third length of wire to the other end of the battery and the socket of the light bulb.



Figure 2.54

Connect the free end of the wire of the switch to the free screw of the light socket.

5. If you swivel the paper clip to touch both drawing pins, the light bulb will glow. When you swivel the paper clip away from the second drawing pin, the light will go out.

Remember this: never touch bare electric wires!

Use red to colour in everything that is operated by means of electricity.

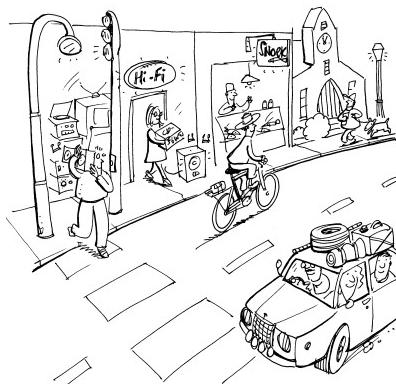


Figure 2.55

2.10.6 Assessment

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

We know this when the learner

3.2 understands the impact of Science and Technology.

2.11 Dangerous ways of using electricity¹¹

2.11.1 NATURAL SCIENCES

2.11.2 Grade 4

2.11.3 ENERGY AND CHANGE

2.11.4 Module 35

2.11.5 DANGEROUS WAYS OF USING ELECTRICITY

2.11.5.1 Activity:

2.11.5.2 To identify dangerous ways of using electricity

2.11.5.3 [LO 1.3, 2.2, 3.2]

When could electricity be dangerous?



Figure 2.56

What is wrong?

Mario wants to take a bath, but the floor tiles in the bathroom are icy cold. He decides to plug the heater's power plug into the power point in the passage and then he takes the heater into the bathroom.

Please warn Mario:



Figure 2.57

Ilze has one power point in her bedroom. She wants to use her heater because it is bitterly cold, but she also wants to use her hairdryer to dry her hair while watching her favourite TV programme.

Please warn Ilze:

¹¹This content is available online at <<http://cnx.org/content/m20113/1.1/>>.

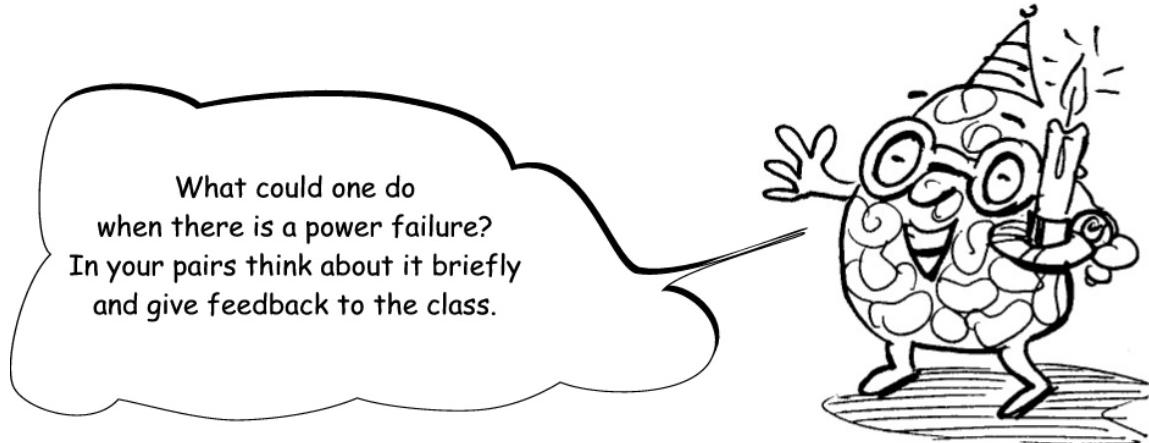


Figure 2.58

Working as a group, take apart a power plug – under the supervision of your educator – to see how the parts fit together. Find out where things go wrong when it does not function.

2.11.5.4 Select words from the list that is provided to complete the sentences that follow:

(electricity wet fingers power plugs)

1. Never play with .
2. See to it that toddlers do not push their into a wall-plug.
3. Remember that can be very dangerous if they are not used correctly.
4. Never handle a power plug while your hands are .

Follow the rules for handling electricity safely .

Choose a partner and decide which of the rules you would like to demonstrate practically. Show why you have to be extremely careful when you use electricity by means of role-playing. Do not use electricity for your role-playing – you must act what you want to show

1. Switch off the power before changing a light bulb.
 2. Do not use damaged electrical cord.
 3. Do not pull on the chord when you want to pull out a plug.
 4. Disconnect the plug when an electrical appliance is not in use.
1. Do not try to repair faulty electrical appliances yourself – call in an electrician.
 2. Do not run an electrical cord underneath a carpet – it could result in a fire.
 3. Do not plug too many power plugs into one contact socket.
 4. Your hands must be dry when you work with any kind of electrical appliance or with electric power.
 5. Never take electrical equipment into the bathroom with you – you may sustain a shock!
 6. Do not touch electrical appliances while you are washing the dishes.
 7. Do not allow small children to play with electrical goods.
 8. Do not leave the cord of an electrical appliance dangling in places where small children might pull down appliances by grabbing the cord.

9. Stay clear of electricity cables that lie on the ground.
10. Do not climb up electricity poles.
11. Do not fly a kite in the vicinity of electricity lines.
12. Stay clear of electrical substations – it is not a place for games.
13. Switch off the power supply before removing a plug from the socket.
14. Do not poke any object into an electric toaster to remove bread.
15. Switch off the power supply without delay if you notice sparks coming from an electrical appliance and inform your parents of it.
16. Do not shelter under trees or walk beneath them when there is lightning.

Discuss this with a partner and report your ideas to the class. Here is a design for a bumper sticker. Design some more bumper stickers (one, at least) to illustrate anyone of the above rules. Try to arrange it in such a way that each learner chooses a different rule for his or her design, so that you will have a variety of designs.

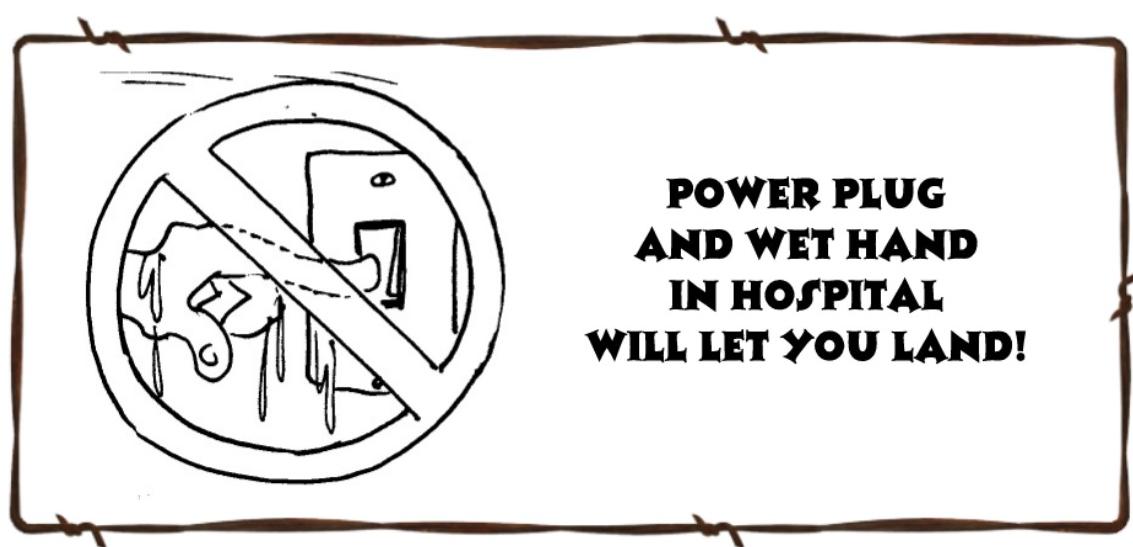


Figure 2.59

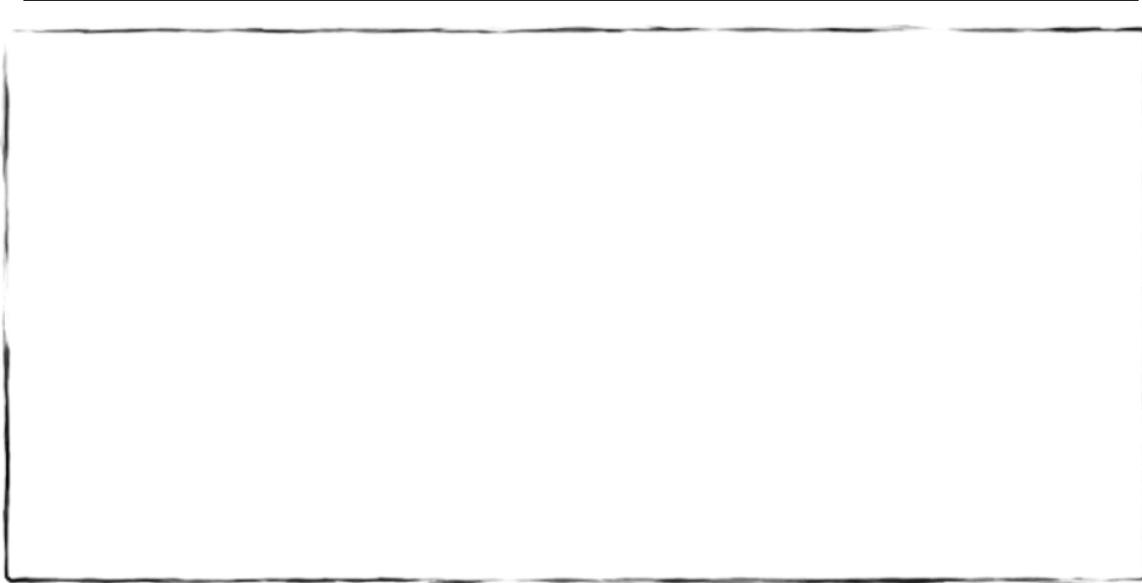


Figure 2.60

2.11.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONThe learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

1.3 evaluates data and provides feedback on observations.

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGEThe learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner

2.2 categorises information.

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENTThe learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

We know this when the learner

3.2 understands the impact of Science and Technology.

2.11.7 Memorandum

When is electricity dangerous?

- Mario wants to take a bath, but the floor tiles in the bathroom are very cold and he decides to warm the bathroom a bit. He plugs the heater into a socket in the passage and takes the heater into the bathroom.

Please warn Mario: Electricity and water do not go together! If you are working with water and it comes into contact with electricity, you can electrocute yourself.

- Ilze has only one power socket in her room. She wants to keep her heater on because it is bitterly cold, but she also wants to dry her hair with the hair drier while watching her favourite television programme.

Please warn Ilze: Too much power from one power socket can cause it to overload and this can lead to a short circuit. You could electrocute yourself by doing this.

Complete the following questions by using the following words:

(electricity wet fingers electrical plugs)

1. Never play with **electrical plugs/power sockets**.
2. See to it that infants do not put their **fingers** into a power socket in the wall.
3. Remember that **electricity** can be very dangerous if it is not used properly.
4. Never touch an electrical plug when your hands are **wet**.

2.12 Problems with electrical appliances¹²

2.12.1 NATURAL SCIENCES

2.12.2 Grade 4

2.12.3 ENERGY AND CHANGE

2.12.4 Module 36

2.12.5 PROBLEMS WITH ELECTRIC APPLIANCES

2.12.5.1 Activity:

2.12.5.2 To identify and solve problems that some people might experience with the use of electric appliances

2.12.5.3 [LO 3.3]

Form groups. Try to think of reasons why it may be difficult for handicapped and blind people, or for young and old people to handle electricity.

Write down some ideas for making it easier for such persons to handle electricity.

2.12.6 Assessment

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

We know this when the learner

3.3 recognises prejudice in Science and Technology by identifying the problems that some people experience in the use of technological equipment.

¹²This content is available online at <<http://cnx.org/content/m20114/1.1/>>.

Chapter 3

Term 3

3.1 Investigating the mysteries of outer space¹

3.1.1 NATURAL SCIENCES

3.1.2 Grade 4

3.1.3 PLANET EARTH AND THE UNIVERSE

3.1.4 Module 37

3.1.5 INVESTIGATING THE MYSTERIES OF OUTER SPACE

3.1.5.1 Activity:

3.1.5.2 Investigating the mysteries of outer space and talking about satellites [LO 1.1, 1.3, 3.1]

Up ... up ... up...

I go

looking down on Earth

below

the moon I pass

with daring swing

and over there ...

a shiny thing ...

a star!

and many millions more

I dodge the planets one by one

here's Venus

oh it's really fun!

and Pluto there

the smallest one

I glide my rocket

down a sunbeam

and land in my bed ...

it was just a dream

A.V

¹This content is available online at <<http://cnx.org/content/m20189/1.1/>>.



Figure 3.1

Illustrate the poem.

It is every child's dream to travel into space but few of us have the wonderful opportunity that Mark Shuttleworth had when he was able to go into outer space in 2002. But we can find out much about space by using a telescope.

3.1.5.3 The telescope



Figure 3.2

An Italian named Galileo Galilei made a telescope with which he could look at distant objects in 1609. He found that the brightly lit area of the sky that we call the Milky Way was actually composed of a myriad of stars. He could also see mountains and craters on the surface of the moon.

3.1.5.3.1 Make your own telescope from waste materials and then carry out the following assignments:

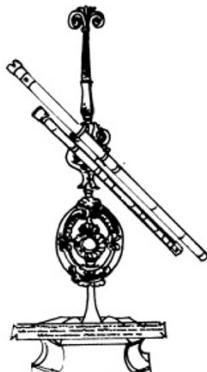


Figure 3.3

Use your telescope to look at the stars at night.

- Do the same during the day but remember not to look directly at the sun as this can seriously damage your eyes.
- You and your friends must now make up a story based on anything that you have seen through your telescope. This does not have to do with the stars but you may write about anything else. Give the class some feedback by means of role-play. Try to be creative!

Here are some ideas:

- one group can be tourists
- another group can be a sports team
- another group can be television actors who act during a news bulletin
- another group can present their story on the radio.

3.1.5.4 Space

We live below a very deep layer of air that we call the atmosphere. The atmosphere provides us with oxygen to breathe; it keeps us warm and protects us from the rays of the sun. If we travel away from the earth through the earth's atmosphere, the air becomes thinner and thinner and it becomes very difficult to breathe. At a height of about 10 km it is not possible to breathe without extra oxygen. At a height of 160 km above the earth's surface there is hardly any air at all. Here we really are on our way into space!

In space there is no atmosphere. Sound does not travel and weather conditions, as we know them on earth, are unknown. Space begins where earth's atmosphere ends. But we do not know where space ends. Spacecraft have already travelled from earth and deep into the universe, but have not yet reached any of the stars that are very far away. These stars are millions of kilometres away.

3.1.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATION The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

- plans investigations;

1.3 evaluates data and provides feedback on observations.

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENTThe learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

We know this when the learner

3.1 understands science and technology in the context of history and personal knowledge.

3.1.7 Memorandum

3.1.7.1 HINTS FOR THIS MODULE:

- Always keep many old magazines in class, so that learners can cut pictures from them
- Show them many pictures from books and magazines
- Let the learners experience the subject matter practically
- Encourage them to be creative when they do assignments or work in groups
- Try to create activities whereby they can discover things themselves
- If possible, show videos. Learners learn a lot through visual observation

3.1.7.2 THE MYSTERY OF OUTER SPACE

Read the poem to the class and let them draw a picture. Let them look for more poems or reports on space that they can read to the class.

3.1.7.3 THE TELESCOPE

Make your own telescope from waste material. You can get ideas in various books

3.1.7.4 SPACE

- Try to show a video about space.

3.2 Talking about satellites²

3.2.1 NATURAL SCIENCES

3.2.2 Grade 4

3.2.3 PLANET EARTH AND THE UNIVERSE

3.2.4 Module 38

3.2.5 TALKING ABOUT SATELLITES

3.2.5.1 Activity:

3.2.5.2 To talk about satellites

3.2.5.3 [LO 1.3, 3.1]

Objects that travel along a route or path in outer space are in an orbit.

Rockets or space shuttles propel satellites into space to where they are placed in an orbit where they have to keep travelling at the correct speed. When they travel too fast, they will veer off into outer space. If they are too slow, they will fall to the earth. People on earth use computers to control the speed of the satellites.

The use of satellites

Hold a group discussion about the uses of satellites and see how many your group can name. Give feedback to the class and write down the best ideas in the space below.

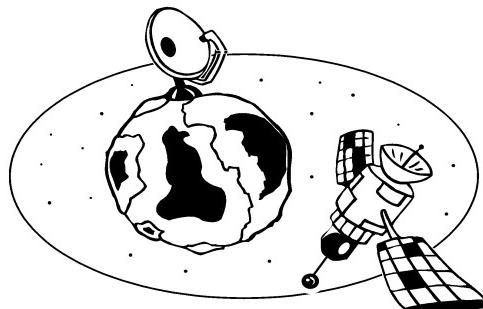


Figure 3.4

Where do satellites come from?

The following sentences have become mixed up. See if you can place them in the correct order by arranging the correct numbers in the blocks below.

1. In 1957 the Russians sent the first man-made satellite into space. Its name was Sputnik 1. Try to find more information on Sputnik 1.
2. Isaac Newton believed that people were able to make satellites that could orbit the Earth in the same way as the moon. But he needed something to get the satellite into space.
3. In 1961, Yuri Gagarin was the first person to be sent into space. After this, satellites were sent into space on a regular basis.
4. In 1929, Robert Goddard, an American, built a rocket that did not go very high, but this started the development of the technology that was needed.

²This content is available online at <<http://cnx.org/content/m20116/1.1/>>.

5. In 1957 the Americans also tried to launch a satellite, the Vanguard, but it exploded on the launching pad!

6. In 1957 a dog called Laika was sent into space in Sputnik 2, and this showed that living creatures could travel in space.

Something interesting: Make your own action picture book.

- Draw 32 blocks of the same size on a clean sheet of paper. Your teacher will show you pictures of a spacecraft being launched as an example. You can draw this or choose your own theme for your picture book.
- Now draw a picture in each block showing the spacecraft taking off. Each block must show the craft a little further away from the launching pad and moving up into space. When the pages are bound together, you can let them flip and it will seem as if the spacecraft is lifting off.
- When all your pictures are complete, cut them out neatly. Make two holes on the one side and place them in the correct order – 1 to 32 with number 1 at the bottom. Thread string through the holes to bind them. You could strengthen it with Sellotape.
- Now hold your book by the side that is bound and flick through the pages from the back to the front with your other hand. Your picture should move. This should be great fun!

3.2.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONThe learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

1.3 evaluates data and provides feedback on observations.

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENTThe learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

We know this when the learner

3.1 understands science and technology in the context of history and personal knowledge.

3.2.7 Memorandum

SATELLITES

- The usefulness of satellites
- Have a group discussion on the usefulness of satellites and see how many your group can name. Give feedback to the class and write down the best ones. These are good examples:
- We can communicate with people all over the world by means of telephone, faxes, Internet, e-mail, etc
- We can take pictures of space
- By means of photos we can gain information about what is happening in space and on other planets
- We can look at earth from space
- We can predict the weather accurately
- We can listen to the radio
- We can watch direct sport broadcasts, even if they happen in other countries

Where and how did satellites originate?

The following sentences have been shuffled. See if you can put them in the right order by placing the numbers correctly in the blocks.

1. Isaac Newton believed it was possible to make a satellite and send it into space to orbit earth, just like the moon. But he needed something to get the satellite into space!

2. An American, Robert Goddard, built a rocket in 1926. It did not go very high, but at least it was the beginning of the technology.

3. In 1957 the Russians sent the first man-made satellite into space. It was called Sputnik 1. See if you can find more information on Sputnik 1.

4. In 1957 a dog called Laika was sent to space in Sputnik 2, to prove that living beings can travel in spacecraft.

5. In 1957 America also tried to launch a satellite, but the Vanguard exploded on the launch pad!

6. In 1961 the first human, Yuri Gagarin, was sent into space. After this, satellites were launched regularly.

- Something interesting: Make your own action picture booklet.
- Show enough pictures and books so that learners can get a good idea of satellites.
- Attached is an example you can show the class. Let them make their own creative booklets.

3.3 Sunrise and sunset³

3.3.1 NATURAL SCIENCES

3.3.2 Grade 4

3.3.3 PLANET EARTH AND THE UNIVERSE

3.3.4 Module 39

3.3.5 SUNRISE AND SUNSET

3.3.5.1 Activity:

3.3.5.2 Investigating the times of sunrise and sunset

3.3.5.3 [LO 1.2]

3.3.5.4 THE LARGE YELLOW BALL

The sun is actually a very big star that looks like a ball of fire in the middle of the universe. It provides the light and warmth that all living things need for growth. The energy that is released within the sun causes the sun to shine. Sunspots on the surface of the sun are seen frequently.

³This content is available online at <<http://cnx.org/content/m20214/1.1/>>.

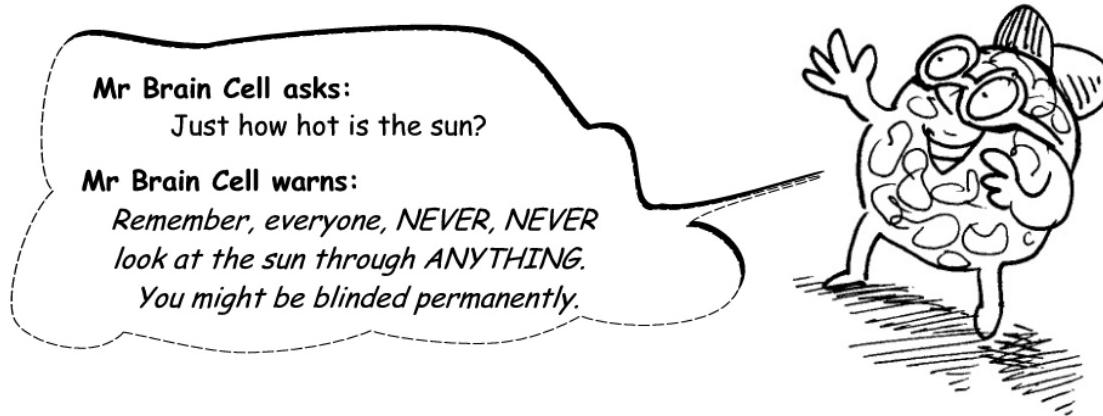


Figure 3.5

Hold a group discussion about the following:

- Where does the sun rise in the morning?
- Where does the sun set in the evening?
- Where do you think the sun goes at night?

Keep a record of the sunrise and sunset times for a period of two weeks. What have you discovered?

3.3.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATION The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

1.2 leads investigations and collects data.

3.3.7 Memorandum

Mr Brain Cell:

- Asks: Man, how hot is it on the sun? **Answer:**
- $6\ 000^{\circ}\text{C}$ ($60 \times$ the temperature of boiling water)

Have a group discussion on the following questions:

- From which direction does the sun rise in the morning? From the east
- In which direction does the sun set in the evening? In the west
- Where, do you think, does the sun go at night? It goes nowhere; the earth revolves around its own axis; the sun is now shining on a different part of the world.

TIME OF SUNRISE AND SUNSET

- Keep record of the sunrise and sunset for two weeks, by having someone bring the newspaper to school every day, so learners can look at the weather forecast. They have to tabulate the sunrise and sunset. They normally get very excited to see how the times change from day to day!

3.4 The earth and its movement⁴

3.4.1 NATURAL SCIENCES

3.4.2 Grade 4

3.4.3 PLANET EARTH AND THE UNIVERSE

3.4.4 Module 40

3.4.5 THE EARTH AND ITS MOVEMENT

3.4.5.1 Activity:

3.4.5.2 Talking about the earth

3.4.5.3 [LO1.2]

THE BLUE SPHERE WE CALL HOME

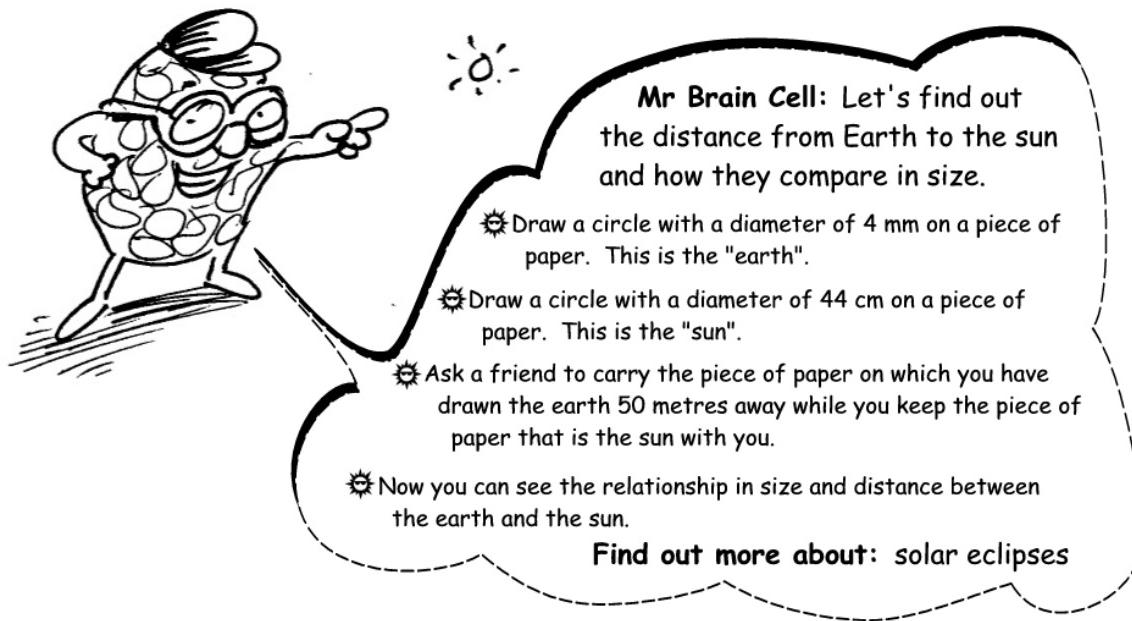


Figure 3.6

⁴This content is available online at <<http://cnx.org/content/m20117/1.1/>>.

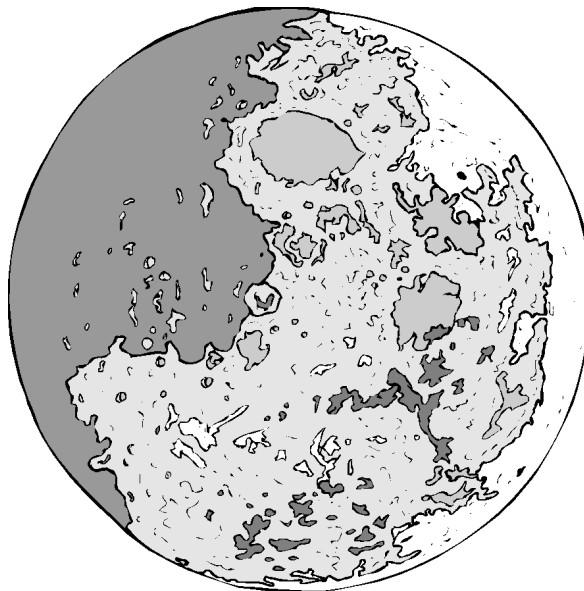


Figure 3.7

- This picture shows what the earth looks like from space. Space travellers tell us that the earth looks like a large, shining ball in the dark sky. It looks as if the surface of the earth is covered in clouds. The blue areas that we see are the oceans of our planet. The earth may seem small when we look at it from the moon, but if you had to dig through the middle of the earth to the other side, you would have to dig a tunnel of 6 400 km long!
- The earth is the only planet on which life is possible, because it has a supply of air, water and soil. Only a quarter (approximately) of the earth's surface is land, the rest is water in the form of the oceans, rivers, lakes, etc. The land consists of deserts, forests, grasslands, mountains and ice.

Divide the class into eight groups. You are going to make posters about this wonderful earth and put them up in the class. Use old magazines to make a collage on an A3 sheet of paper.

Group 1: Oceans

Oceans are made up of salt water and they cover a large part of the earth. Wind creates waves and keeps the water in motion all the time. The average depth of the ocean is 4 000 m. Plants and fish live even deep down in the sea.

Group 2: Deserts:

These are dry areas where it hardly ever rains. It is usually sandy, with rocks and stones here and there. There is very little water and therefore very few plants grow. The Sahara, in Africa, is the largest desert in the world.

Group 3: Polar Regions:

The Polar Regions are at the North and South Poles. They are covered in snow and ice and are the coldest places on earth.

Group 4: Grasslands:

These are relatively flat areas that receive very little rain. There are few trees, but many animals such as buck, zebras, giraffes, etc. live here. After rains have fallen there usually is much grass that can be eaten by the animals.

Group 5: Forests:

These are areas where trees grow very densely. Many animals and snakes and many types of birds and spiders are found in these forests.

Group 6: Rivers:

The longest river in the world is the Nile, which is approximately 6 671 km long. Rivers usually have their sources in mountains and may have waterfalls. Rivers usually have fresh water, sometimes fish are found in them and towns and factories are often developed alongside them. Rivers usually end at the sea and often form deltas where the river flows into the sea. Can you explain what a delta is?

Group 7: Mountains:

The highest mountain in the world is Mount Everest, which is 8 848 metres high. It is very cold on the highest peaks of such high mountains.

Group 8: Plant and animal life:

We find plants and animals everywhere on earth.

3.4.5.4 ACTIVITY:

3.4.5.5 Investigating and describing the movement of the earth

3.4.5.6 [LO 1.3, 2.1]

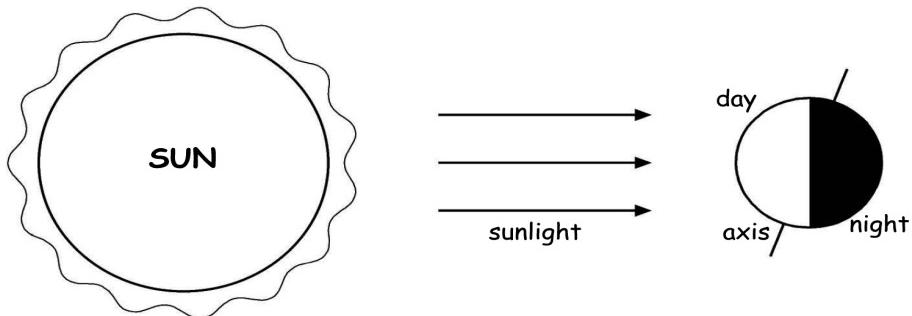


Figure 3.8

3.4.5.7 What causes day and night?

Use a ball and paste a map of South Africa on it. This ball represents the earth. You could also use a real globe. Use a torch to represent the sun. Spin the 'earth' to demonstrate the change from day to night. One full turn takes 24 hours (1 day). At the same time move the 'earth' around the 'sun' to demonstrate how the seasons come about. This takes $365\frac{1}{4}$ days (1 year).

Use the following key words to describe how day and night occur. Write a paragraph on the lines that are provided:



Figure 3.9

Key words: earth, spin, 24 hours, axis, sun, day, night

3.4.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATION The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

- leads investigations and collects data.

1.3 evaluates data and provides feedback on observations.

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGE The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner

2.1 recalls significant information.

3.4.7 Memorandum

This is a very pleasurable activity where learners learn to work together and to look at magazines with enquiring minds in order to find the right pictures for their collages. These can look beautiful in class or in a corridor.

Earth's movement

- How do day and night happen?

Use the following key words to describe how day and night happen. Write a paragraph on the following lines:

Key words: earth, revolves, 24 hours, axis, sun, day, night

The earth revolves around its own axis every 24 hours. When any part of the earth faces the sun, it is day; when it faces away from the sun, it is night.

3.5 The stars and planets⁵

3.5.1 NATURAL SCIENCES

3.5.2 Grade 4

3.5.3 PLANET EARTH AND THE UNIVERSE

3.5.4 Module 41

3.5.5 THE STARS AND PLANETS

3.5.5.1 Activity:

3.5.5.2 Collecting information about the stars and planets for building models of them and talking about them

3.5.5.3 [LO 1.2, 2.1]

We often hear the expression: “Wow, you’re a star!” This means that you have performed brilliantly. It is wonderful to be compared with a star that holds so much fascination for people; they shine and are very beautiful.

Stars occur in groups and people who looked at them in the past imagined that they represented something. People who live south of the Equator can easily identify what they call the Southern Cross on a clear evening. On a dark night the Milky Way galaxy can be seen very clearly. But how does a star come into being?

There is a lot of gas and there are many clouds of dust in the universe.

Sometimes these are drawn together and form bigger masses. As they increase in size, they become very hot - hotter than 1 000 000 degrees Celsius.

The gas Helium is formed and when this happens, an incredible amount of energy and light is released.

This mass of gas and dust now begins to sparkle as a star!

There are nine planets that orbit the sun. Their sizes differ, they take different numbers of days to orbit the sun and they are at different distances from the sun.

⁵This content is available online at <<http://cnx.org/content/m20200/1.1/>>.

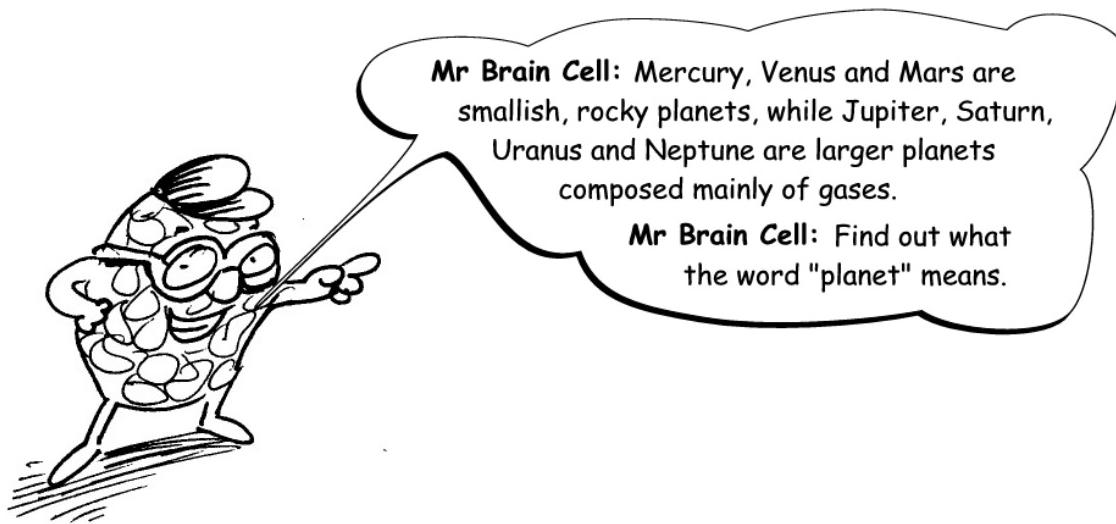


Figure 3.10

1. Find a book that deals with the planets in the library and do some research. Write the names of all the planets on triangular pieces of paper and attach each of them to a stick like a flag. Also make one of these for the Sun. Go to the schools playing field/s and stick the Sun flag into the ground. Now place the other planets around the Sun in their correct order, e.g. Mercury is the nearest to the Sun, etc.

2. Cut circles of paper and write the name of a planet on each one. Hang these below one another on a clothes hanger, in the correct order with the Sun at the top. Join them together with any suitable thread and hang them in the classroom.

3.5.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATION The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

- leads investigations and collects data.

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGE The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner

2.1 recalls significant information.

3.5.7 Memorandum

Mr Brain cell

- Find out what the word "planet" means
Answer
- Wanderer

3.6 The moon and its function⁶

3.6.1 NATURAL SCIENCES

3.6.2 Grade 4

3.6.3 PLANET EARTH AND THE UNIVERSE

3.6.4 Module 42

3.6.5 THE MOON AND ITS FUNCTION IN THE WORLD

3.6.5.1 Activity:

3.6.5.2 Talking about the moon and its function in our world

3.6.5.3 [LO 1.2,1.3, 3.1]



Figure 3.11

- On most evenings the moon, our nearest neighbour in space, lights up our atmosphere. The moon orbits the Earth in approximately 27 days. Some grandfathers and grandmothers know wonderful stories about the moon. Speak to your grandparents and come and share their stories with the learners in your class.
- Look at the moon for the next few evenings and see how its shape seems to change. Although the moon seems to shine, it is really the rays of the Sun that are reflected off the moon. The moon also moves around the Sun and the rays of the sun light up one side of the moon. The particular shape of the moon that we see is determined by the position of the moon in relation to the sun and the earth. The changes in the shape of the moon are known as the 'phases' of the moon.
- The moon is about a quarter of the size of the earth. We know what the moon looks like because photos have been taken from satellites and astronauts have also taken photos on the moon. The moon is approximately 3 476 km in diameter and about 380 000 km from the earth. It is covered in craters, dust and mountains.

⁶This content is available online at <<http://cnx.org/content/m20217/1.1/>>.

Let's go to the moon! Design a vehicle that we can use for travelling on the moon. .

Draw your design in this space.



Figure 3.12

The phases of the moon

The **new moon** occurs when the moon is between the earth and the sun. We cannot see the moon then because the sunlit side is turned away from the earth. When is the next new moon?

Date:

Draw what you see on that evening.

The **first quarter** is what we have when we can see half of the sunlit side of the moon. This occurs about a week after the new moon. When is the next first quarter?

Date:

Draw what you see on that evening.

The **full moon** means that we can see the whole of the side of the moon that is lit by the sun. This takes place about a week after first quarter. When is the next full moon?

Date:

Draw what you see on that evening.

About a week later we again see only half of the sunlit side of the moon. This we call the **last quarter**. When will the next last quarter occur?

Date:

Draw what you see that evening.

Then the phases start all over again.

Do a brief research task about Neil Armstrong, the American astronaut who was the first person to walk on the moon in July 1969. Your task must have the following pages:

1. Cover
2. Contents page
3. Brief content
4. Bibliography

Right: The Saturn V rocket that sent the Apollo space shuttle to the moon looked like this.

Below: The space-suits the men wore looked like this.

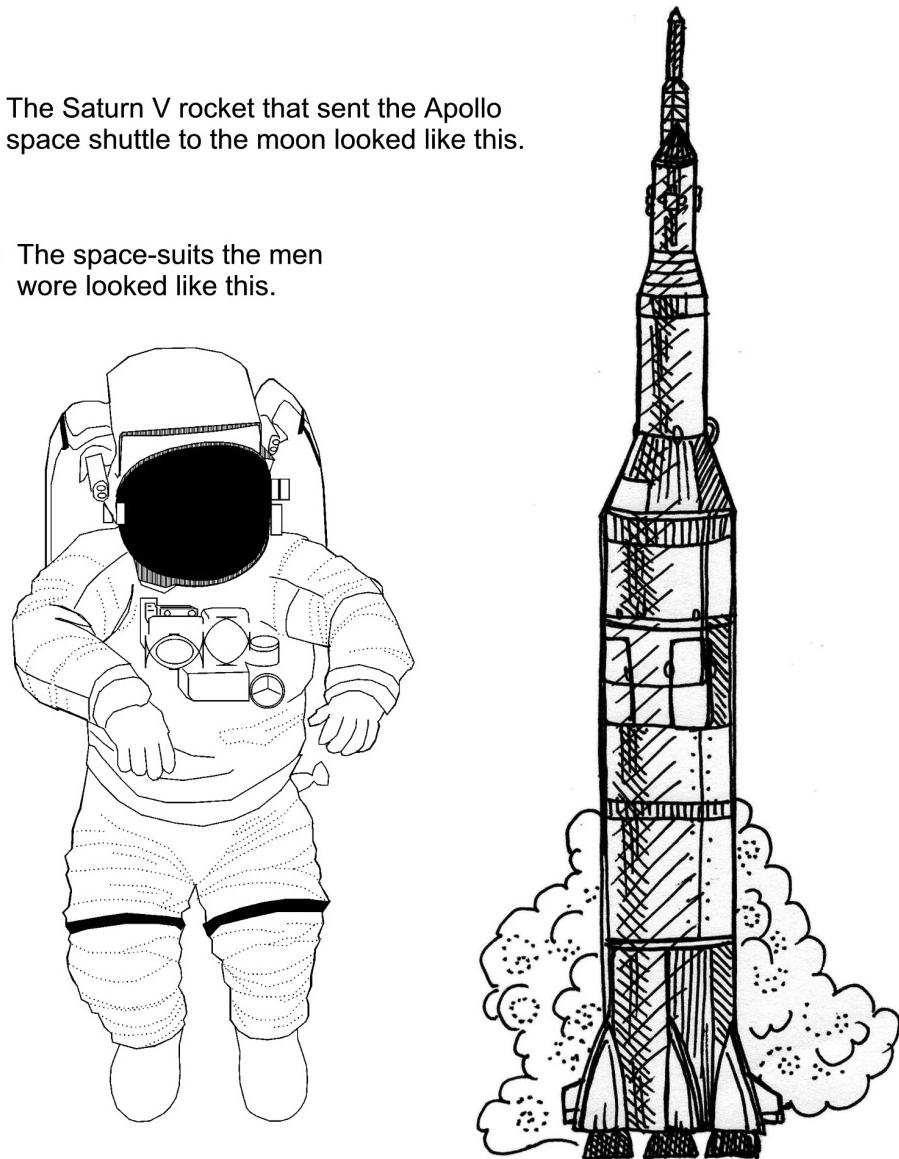


Figure 3.13

Cultural traditions and special events

Some cultural traditions and special events take place at times determined by the shape or position of the moon.

The Khoisan believed that they could call upon the sun, moon or stars for help at times of sickness or need. They often danced at the time of the full moon and mimicked animals or hunting scenes.

The Khoikhoi worshipped the moon. They believed that the gods provided the rain and they regularly worshipped at the time of the new or full moon. They danced and held festivals during full moon because the full moon was regarded as the symbol of birth and death.

The most important event on the Islamic calendar is the Fast of Ramadan that starts at the first sign of the new moon in October. During the fast Moslems may only eat or drink water after sunset. The Fast of Ramadan lasts for a month, until the next new moon is sighted.

Find out more about cultural traditions and conduct a class discussion. Draw the most interesting thing that you have found out today in the space below.



Figure 3.14

3.6.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATION The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

- leads investigations and collects data.
- evaluates data and provides feedback on observations.

LEARNING OUTCOME 3:SCIENCE, SOCIETY AND THE ENVIRONMENT The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard
We know this when the learner

- understands science and technology in the context of history and personal knowledge.

3.6.7 Memorandum

The moon and its role in our world

- The phases of the moon: See the newspapers and let the learners look at the moon themselves, so they can draw it.
- Research assignment on Neil Armstrong: Let the learners bring their own research material to school. If they do not have sources, make photocopies and let them sort the information. Teach them how to do research, and that they may not plagiarise.

3.7 Talking about the weather⁷

3.7.1 NATURAL SCIENCES

3.7.2 Grade 4

3.7.3 PLANET EARTH AND THE UNIVERSE

3.7.4 Module 43

3.7.5 TALKING ABOUT THE WEATHER

3.7.6 Activity:

3.7.7 Talking about the weather

3.7.8 [LO 1.3, 2.1]

One of the things that change most from day to day is the weather. The weather influences our decisions about where we would like to live, the clothes that we wear and the things that we do.

We always want to know what the weather will be like. We therefore regularly look at the weather forecasts on television, and listen to it on the radio and read about it in the newspapers.

Discuss this in your group and suggest some reasons for wanting to know what the weather will be like. What is weather actually?

- Warmth and sunlight travel through the earth's atmosphere. The rays of the sun affect the air in four different ways: It changes the temperature, the humidity, the air pressure and the wind.

Write a sentence about each of these. Look at the pictures that illustrate them:

Temperature

⁷This content is available online at <<http://cnx.org/content/m20120/1.1/>>.

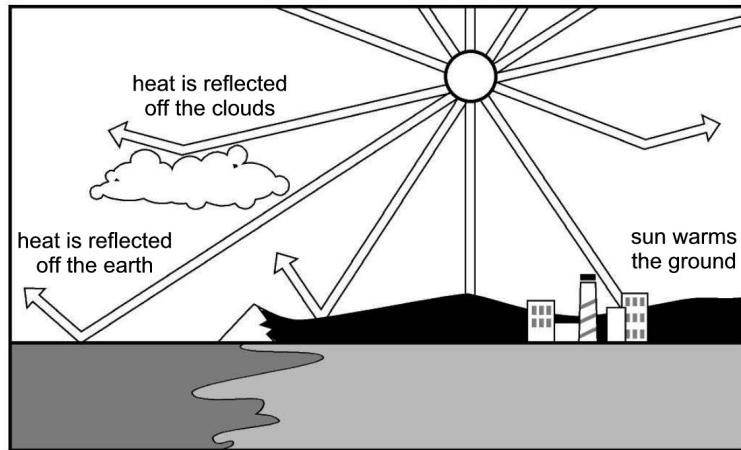


Figure 3.15

3.7.8.1 Humidity

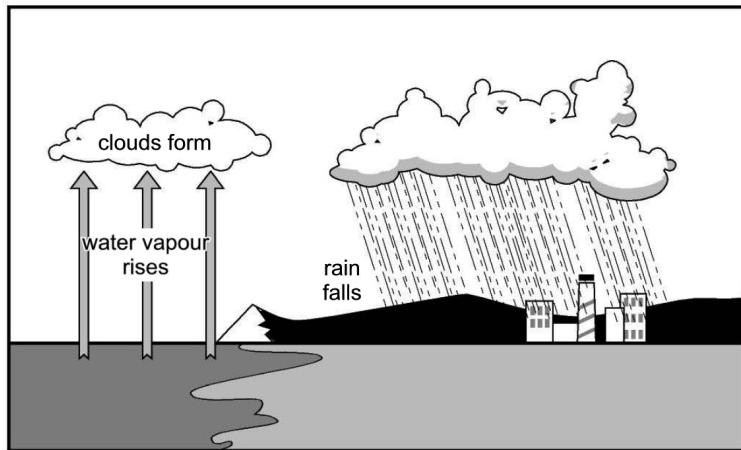


Figure 3.16

3.7.8.2 Air pressure

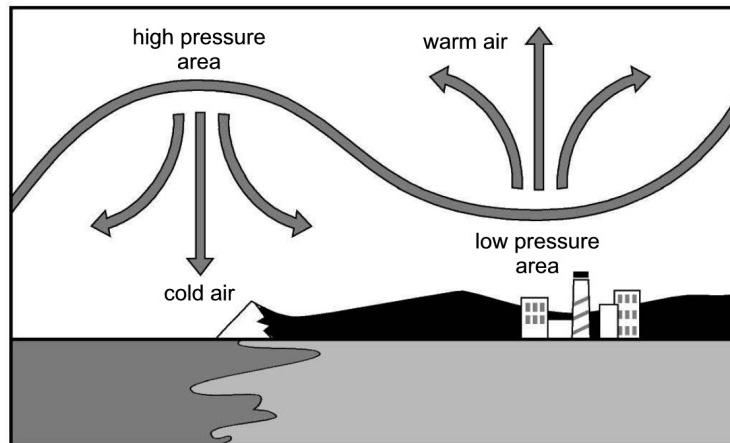


Figure 3.17

3.7.8.3 Wind

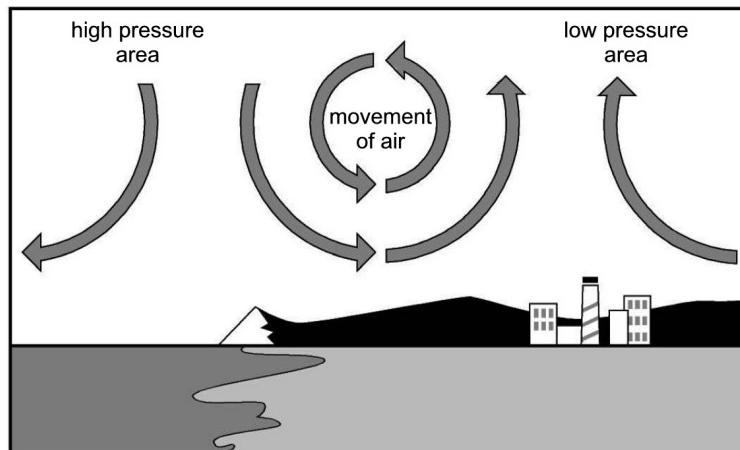


Figure 3.18

3.7.8.4 Try the following:

Make a flag and hang it outside to find out how strong the wind is.

Hang spoons from a metal clothes hanger using nylon to tie them and listen to the tinkling that tells you that the wind is blowing.

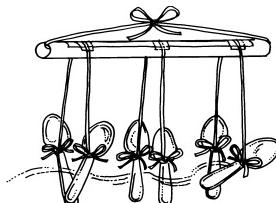


Figure 3.19

3.7.9 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONSThe learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

1.3 evaluates data and provides feedback on observations.

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGEThe learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner

2.1 recalls significant information.

3.7.10 Memorandum

- Name a few reasons in your group why it might be useful to know in advance what the weather will be like.

Possible reasons

- When you go out, you want to know whether it is necessary to take a coat or rain jacket, especially to sports and outdoor events
- Farmers plan their daily chores according to the weather
- In case of danger (e.g. hurricane or tornado) safety measures must already be in place
- We want to know whether we can hang out our washing!

Temperature: The sun heats the earth. The heat is reflected off the clouds and the earth to determine the temperature of the air.

Humidity: Water vapour rises from the earth and sea to form clouds. When many water droplets accumulate, rain falls to the earth. Humidity is the moisture content of the air.

Pressure: Atmospheric pressure is determined by air that is forced in different directions.

Wind: Wind is air that moves rapidly.

3.8 Weather forecasting⁸

3.8.1 NATURAL SCIENCES

3.8.2 Grade 4

3.8.3 PLANET EARTH AND THE UNIVERSE

3.8.4 Module 44

3.8.5 WEATHER FORECASTING

3.8.5.1 Activity:

3.8.5.2 Talking about weather forecasting

3.8.5.3 [LO 1.1, 1.2, 1.3, 2.1, 3.1]

Where do weather forecasters get their information?

They get the information from weather satellites, weather balloons and earth stations. Metsat is the name of a weather satellite that orbits the earth.

A camera on Metsat is used for taking photographs of clouds and snow and it also shows approaching storms. The photographs can also be used to identify warm and cold areas of the earth.

Information is collected about the temperature, humidity (this is the moisture in the air), wind speeds and directions, the types of clouds, air pressure (atmospheric pressure) and rainfall. All the information is sent to a weather station where it is fed into a computer for processing.

After this has been done, a weather chart is drawn and sent to all the media (television, radio and newspapers).

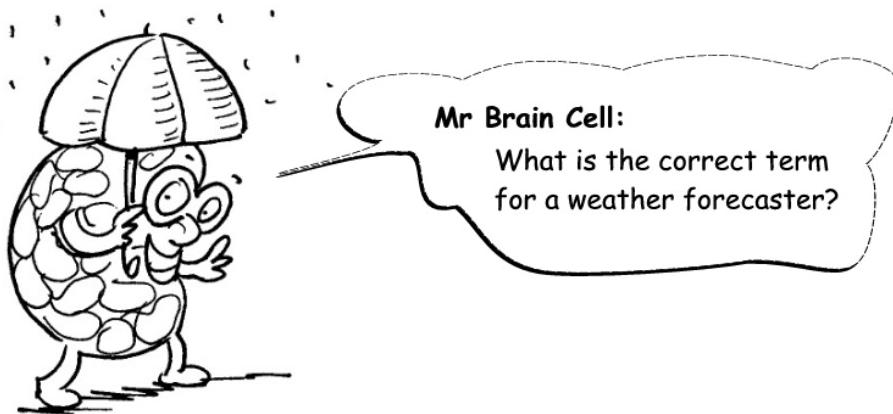


Figure 3.20

Which one of you would like to present today's weather to the class as it is presented on television?

⁸This content is available online at <<http://cnx.org/content/m20210/1.1/>>.

Try to get hold of a newspaper that has a weather chart each day. Cut it out and study the key that indicates the different types of weather carefully.

Look at the following example:

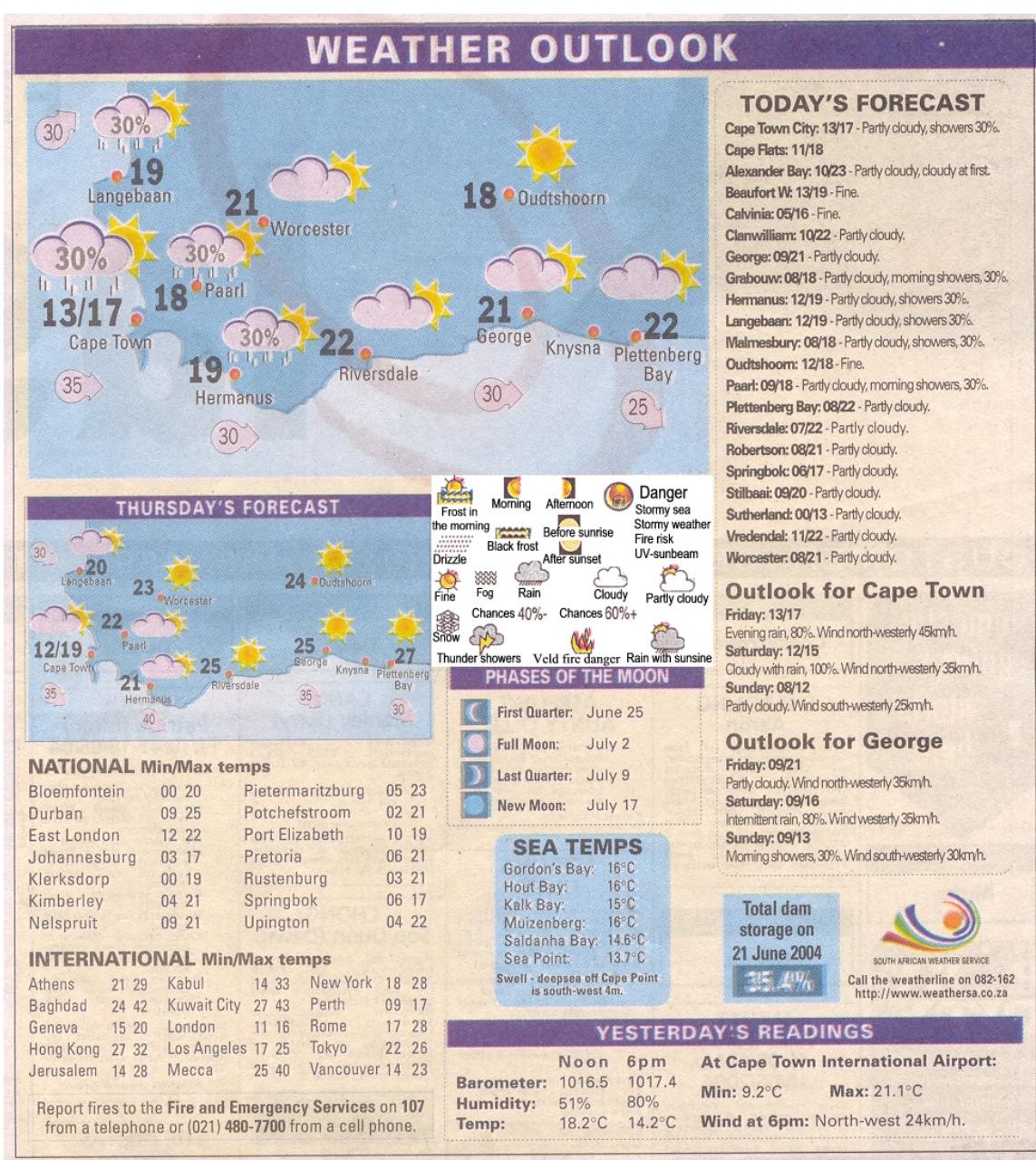


Figure 3.21

Study the key and write down the correct names of the signs:



Figure 3.22



Figure 3.23



Figure 3.24



Figure 3.25



Figure 3.26



Figure 3.27



Figure 3.28



Figure 3.29



Figure 3.30



Figure 3.31

Draw a picture to show your favourite kind of weather.



Figure 3.32

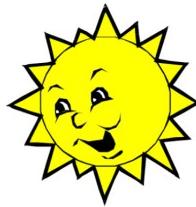


Figure 3.33

SUN

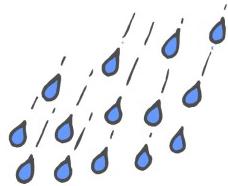


Figure 3.34

RAIN

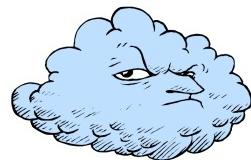


Figure 3.35

OVERCAST

Keep your own weather chart for one week. Draw the sun, raindrops or a cloud in the weather column, and fill in the wind speed and temperature.

Day Weather Wind speed Temperature Monday Tuesday Wednesday Thursday Friday Saturday Sunday

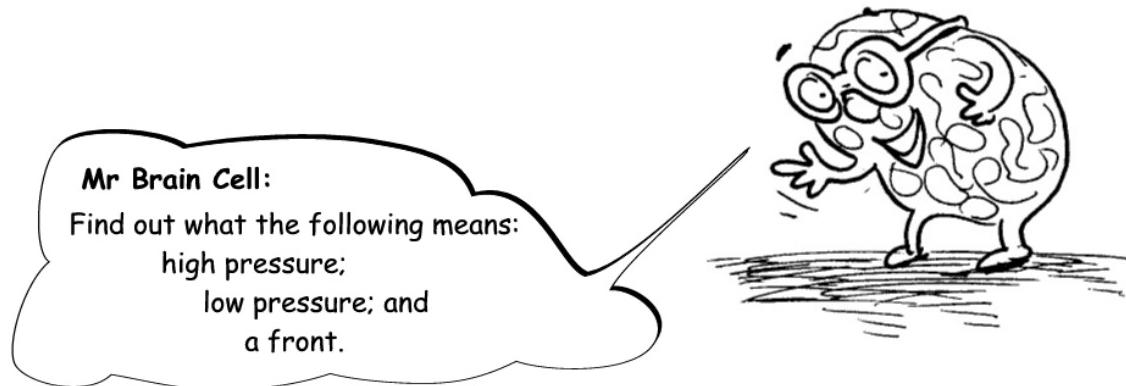


Figure 3.36

3.8.6 Assessment

LEARNING OUTCOME 1 : SCIENTIFIC INVESTIGATIONS

The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

1.1 plans investigations;

1.2 leads investigations and collects data;

1.3 evaluates data and provides feedback on observations.

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGE

The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner

2.1 recalls significant information.

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT

The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

We know this when the learner

3.1 understands science and technology in the context of history and personal knowledge.

3.8.7 Memorandum

Mr Brain Cell:

- What is the correct name for someone who predicts the weather? Answer:
- A meteorologist

Study the key and write down the correct names: see key on map.

Mr Brain Cell:

- Find out what the following words mean:
- High pressure
- Low pressure
- A front

High pressure: When a high-pressure system moves over the land, it normally means that it is going to be a fine day. Cold air moves out and down and becomes warmer.

Low pressure: A low-pressure system normally brings rain and cloudy conditions. Cold air moves in and up and becomes cold.

Front: We frequently see a front approaching the land. This is only the direction in which the cold or warm air moves.

3.9 Stormy weather⁹

3.9.1 NATURAL SCIENCES

3.9.2 Grade 4

3.9.3 PLANET EARTH AND THE UNIVERSE

3.9.4 Module 45

3.9.5 STORMY WEATHER

3.9.5.1 Activity:

3.9.5.2 Learning about stormy weather conditions

3.9.5.3 [LO 2.1, 3.1]

Stormy weather

⁹This content is available online at <<http://cnx.org/content/m20121/1.1/>>.

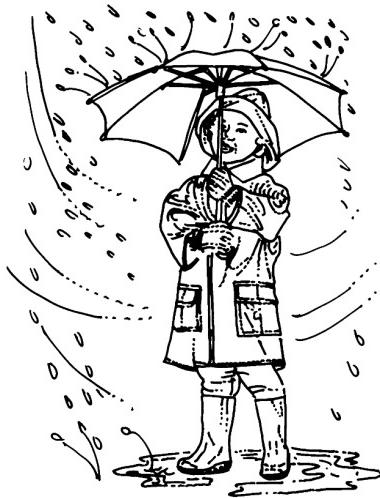


Figure 3.37

:
What do you do when the weather is stormy? Tell the class about funny stories related to storms.
Dark clouds converge in the air. Heavy rains fall to the earth. Now and again there is a bright flash of lightning and we hear the roar of thunder. But what is actually happening?



Figure 3.38

Clouds:

The air is full of small dust particles. Water drops form around such dust particles and then form clouds together with millions of other drops.

Try the following:

Mark an empty bottle in mm and place it outside when it rains.

Lightning:

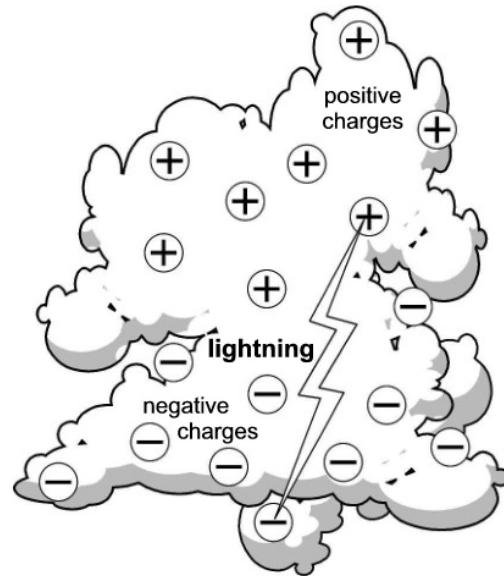


Figure 3.39

During a storm strong winds blow the small water drops that have formed around the dust particles, into the centre of the clouds where they bounce against each other. Each of the small particles of a cloud has either a positive or negative electrical charge. When the particles bump against each other the charges separate. The majority of the positive charges move to the top of the cloud and the negative charges move toward the bottom of the cloud. Lightning is a massive electrical spark in the cloud. This spark occurs when the negative charges in one cloud come into contact with the positive charges in another cloud or with the ground.

Thunder

Thunder is the loud noise that you hear when warm air and cold air suddenly come together. When lightning brightens the sky, it also heats the surrounding air. When this hot air comes into contact with the cold air, a gigantic wave of moving air causes the clap of thunder.

Dangerous weather**Tornado**



Figure 3.40

This is a very strong wind that is caused when a front with cold and dry air comes into contact with warm, moist air. It causes a large black cloud in the air. The warm air rises rapidly and more warm air moves in below it to replace it. Sometimes the rising air begins to move in a spiral and a tornado develops. If a tornado reaches the ground, it causes incredible damage because it sucks up everything that it encounters on the ground into the air.



Figure 3.41

Hurricane

This is a very big storm that starts on the surface of tropical seas. It consists of a large quantity of wind and rain that begins to spin around its centre, which we call the “eye”. It moves forwards as it rotates and creates enormous waves that are very destructive.

Cut A4 sheets of paper into four (into quarters) to have one small sheet of paper for each learner in the class. Each learner must draw an aspect of the weather on his or her piece of paper. Work clearly and neatly. Stretch a washing line across the classroom and hang the drawings of the “weather conditions” from the line!

3.9.6 Assessment

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGEThe learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner

2.1 recalls significant information.

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENTThe learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

We know this when the learner

3.1 understands science and technology in the context of history and personal knowledge.

3.10 Describing the seasons¹⁰

3.10.1 NATURAL SCIENCES

3.10.2 Grade 4

3.10.3 PLANET EARTH AND THE UNIVERSE

3.10.4 Module 46

3.10.5 DESCRIBING THE SEASONS

3.10.5.1 Activity:

3.10.5.2 Describing the seasons

3.10.5.3 [LO 1.2. 1.3]

Discuss each picture in your group. Which changes take place in the weather during each of the conditions that are illustrated? Think of the vegetation, the animals, people, clothing, the eating habits of people and animals, sleeping patterns, etc.



Figure 3.42

¹⁰This content is available online at <<http://cnx.org/content/m20123/1.1/>>.



Figure 3.43

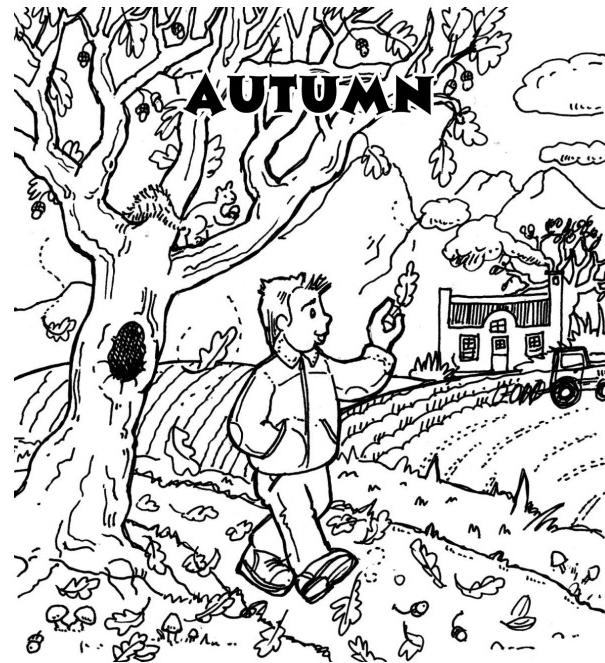


Figure 3.44



Figure 3.45

Using old magazines cut out pictures for a collage of winter on the one side of your paper and summer on the other side. Paste pictures of things that we wear and eat in the specific seasons and write neat captions for each one.



Figure 3.46

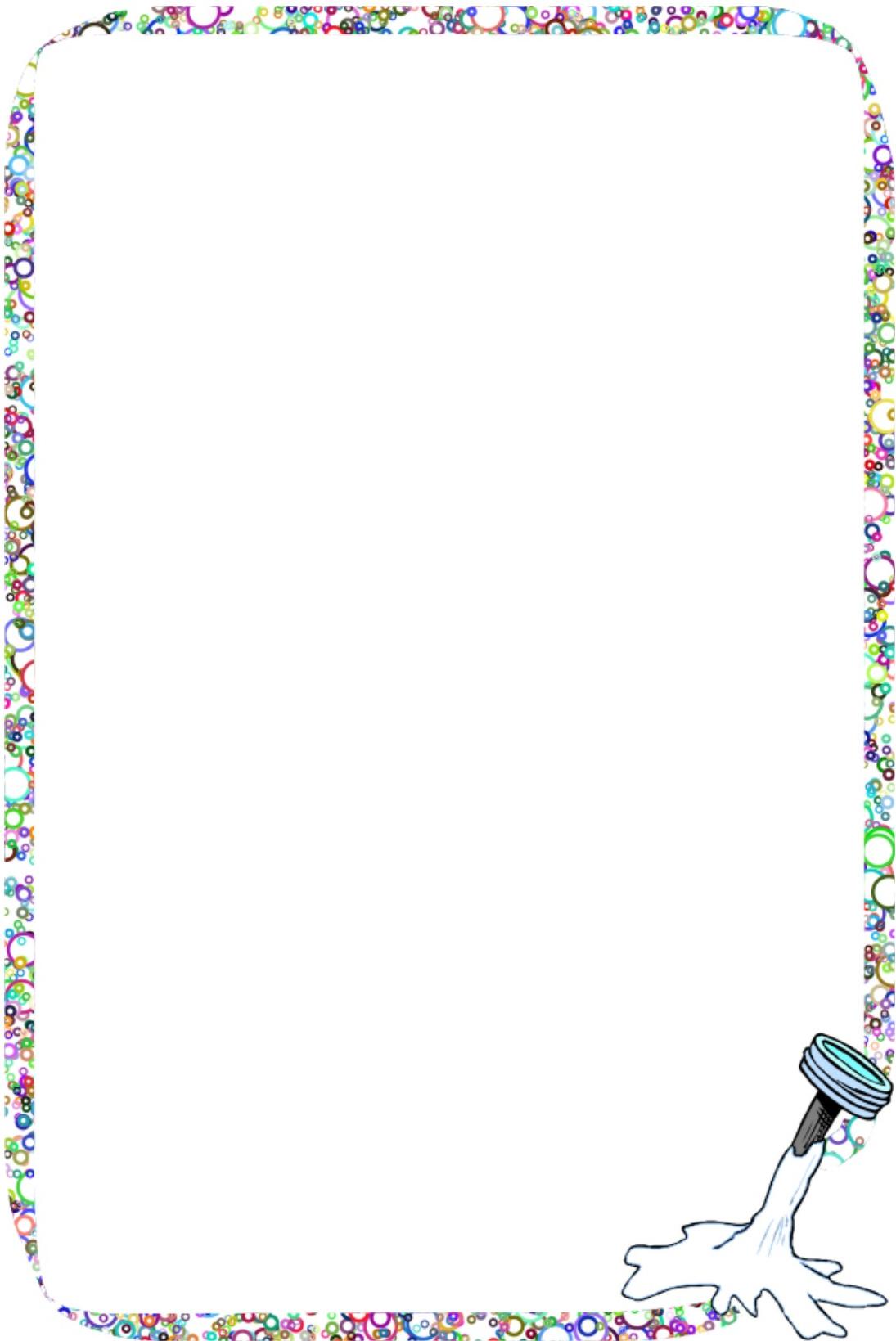


Figure 3.47

3.10.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONSThe learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

1.2 leads investigations and collects data;

1.3 evaluates data and provides feedback on observations.

3.10.7 Memorandum

Have class discussions on the seasons and hold an exhibition of the various seasons.

3.11 Talking about the oceans¹¹

3.11.1 NATURAL SCIENCES

3.11.2 Grade 4

3.11.3 PLANET EARTH AND THE UNIVERSE

3.11.4 Module 47

3.11.5 TALKING ABOUT THE OCEANS

Activity:

Talking about the oceans and their significance for people
[LO 1.2]

Water covers about 70% of the surface of the earth. The three largest oceans on the earth are the Pacific, the Atlantic and the Indian oceans.

Answer the following questions:

1. What is the name of the largest ocean?
2. Which two oceans border South Africa?
3. Why do we say that the sea is a resource for humankind?
4. What other products come from the sea?
5. What sports are practiced on the sea?

Where do animals live in such cold areas?

¹¹This content is available online at <<http://cnx.org/content/m20134/1.1/>>.



Figure 3.48

Animals live on the land or in the water.

Seals swim under the icecaps. They have a thick layer of fat, called blubber, under their skin, which keeps them warm.

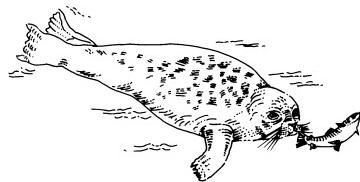


Figure 3.49

Their food:

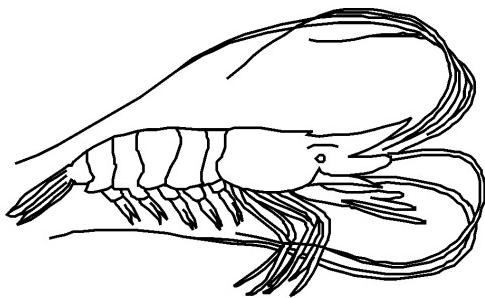


Figure 3.50

Millions of tiny creatures that look like shrimps and are called animal plankton live in the icy seas. Fish, seals, whales and seabirds eat these.

3.11.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONSThe learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

1.2 leads investigations and collects data.

3.11.7 Memorandum

Oceans

1. Pacific Ocean
2. Atlantic and Indian Oceans

1. There are fish, sharks, whales and other marine animals that are edible to man. Many other things are made from shells and sea plants.
2. Diamonds, gas, coal and oil
3. Regattas, skiing, boat races, angling, kayaking, swimming, etc.

3.12 Life at the north and south poles¹²

3.12.1 NATURAL SCIENCES

3.12.2 Grade 4

3.12.3 PLANET EARTH AND THE UNIVERSE

3.12.4 Module 48

3.12.5 LIFE AT THE NORTH AND SOUTH POLES

3.12.5.1 Activity:

3.12.5.2 Talking about life in the Polar Regions

3.12.5.3 [LO 1.2]

3.12.5.4 ANIMAL LIFE AT THE NORTH POLE (The Arctic)



Figure 3.51

Wolves, bears, squirrels and small birds live in the forests and in the summer the caribou, which is a sort of American reindeer, migrates to the north where it lives off wild plants.

Musk oxen live off the tundra throughout the year. They defend themselves from attacking wolves by standing in a tight circle.

In the winter most of the animals hibernate. Bears sleep in their lairs for most of the time and the squirrels curl up in their snug holes. They eat sufficient amounts of food in the summer to provide their bodies with energy through the winter.

¹²This content is available online at <<http://cnx.org/content/m20130/1.1/>>.

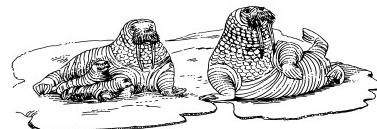


Figure 3.52

Walruses also live here. They are family of the seals. They are mammals that are born live and drink from their mothers.

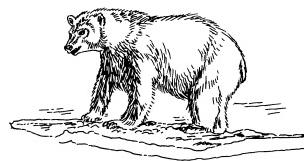


Figure 3.53

Polar bears are among the largest animals in the world. They have a thick, soft layer of hair against the skin and longer hair that forms a layer of fur over it.

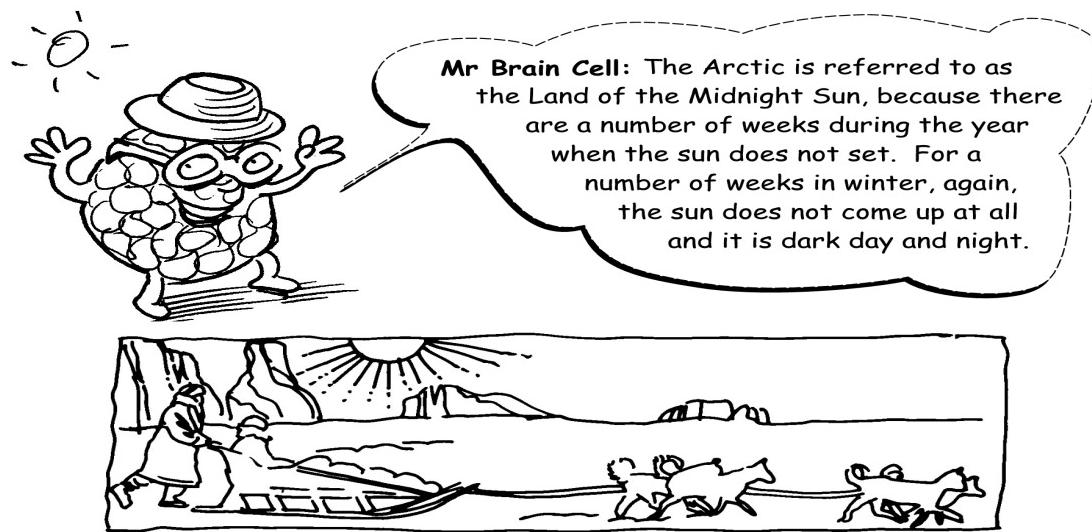
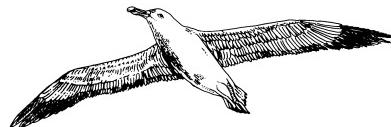


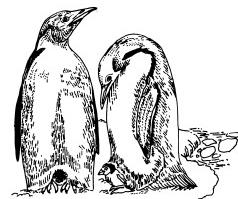
Figure 3.54

3.12.5.5 Animal life at the South Pole (Antarctica):**Figure 3.55**

The albatross is one of the largest of all the seabirds, and also lives at the South Pole. These birds fly over the sea looking for food in the water.

The largest animal in the world, the blue whale, lives in the waters of Antarctica. It grows to a length of 30 metres.

Very few types of animals live in Antarctica, but in the summer months seals and penguins go there to breed. The young are safe because there are relatively few predators to catch them.

**Figure 3.56**

Many different kinds of penguins live at the South Pole. The largest is the emperor penguin that can grow up to one metre in height. These birds cannot fly but they do swim very well.

3.12.5.6 How do people survive at the poles?**Figure 3.57**

The Inuit people live in the Arctic region. They keep warm by wearing clothes made of animal skins. They live in small villages where it is necessary to melt ice to obtain water in winter.

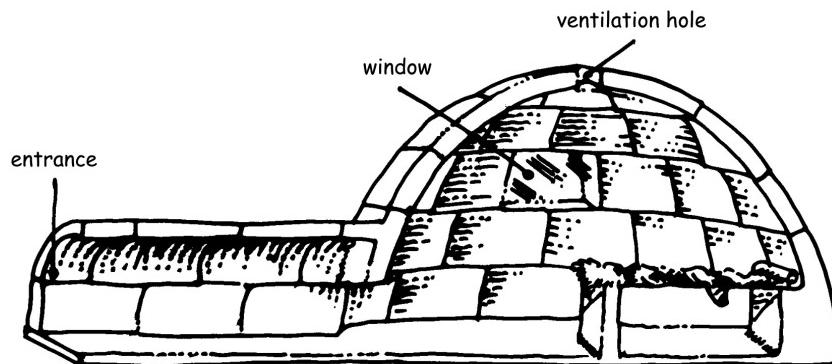


Figure 3.58

They hunt to obtain food and live in ice huts called igloos. They build circles of ice blocks on top of each other, making the circles smaller and smaller until they form a dome. The spaces in between the blocks are filled with snow.

Another group of people, the Saami, lives in Lapland. They are well known for keeping reindeer for milk, meat and fur. They enjoy wearing traditional clothes when taking tourists for rides on snow sleds.

But these people work in factories nowadays and live in houses made from stone and wood. They wear modern clothes and ride around on snowmobiles.

Write a paragraph of 150 words on how animals have adapted to living in Polar Regions.

3.12.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONS The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

1.2 leads investigations and collects data.

3.13 The seasons in the polar regions¹³

3.13.1 NATURAL SCIENCES

3.13.2 Grade 4

3.13.3 PLANET EARTH AND THE UNIVERSE

3.13.4 Module 49

3.13.5 THE SEASONS IN THE POLAR REGIONS

3.13.5.1 Activity:

3.13.5.2 Talking about the seasons in the Polar Regions

3.13.5.3 [LO 1.3]

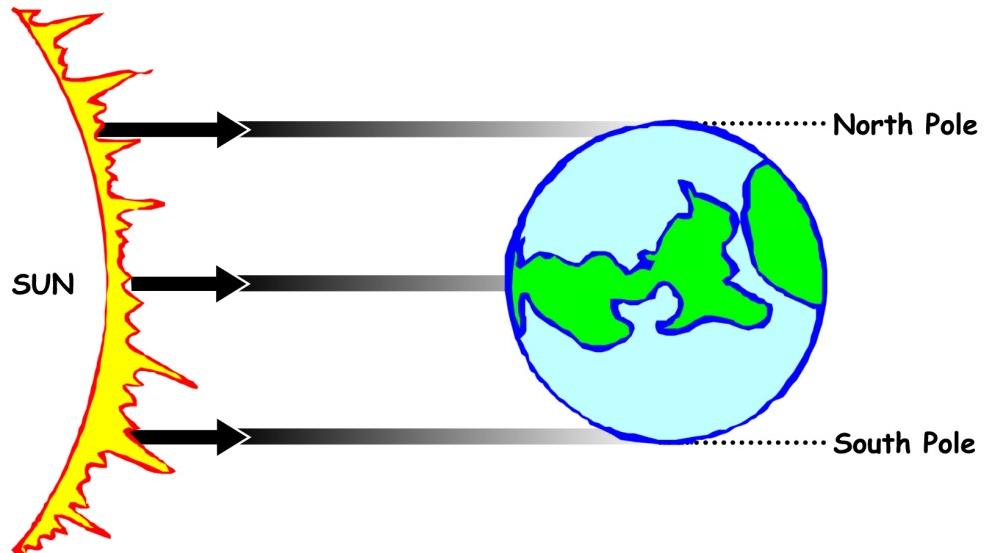


Figure 3.59

If we look at a globe, the North Pole is at the top and the South Pole is at the bottom. The northern polar region is also known as the Arctic and the southern polar region is called Antarctica. These are some of the coldest parts of the whole world and many parts are covered in ice throughout the year.

¹³This content is available online at <<http://cnx.org/content/m20133/1.1/>>.

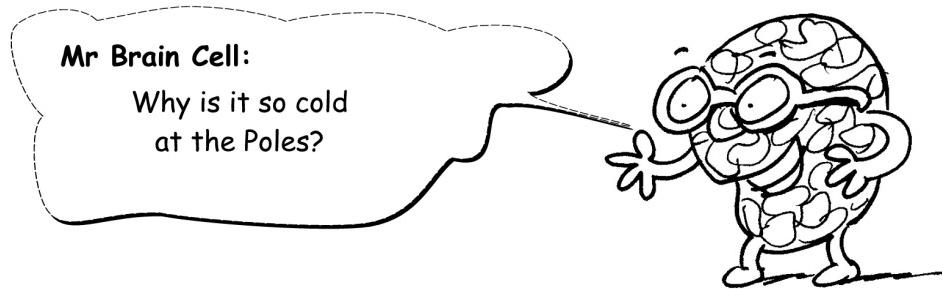


Figure 3.60

3.13.5.4 Different kinds of ice:

Ice formed on land is called sheet ice.

Ice "rivers" that are formed on mountains and move slowly down the valleys to the sea, are called glaciers.
Floating ice formed on the surface of the sea is called pack ice.

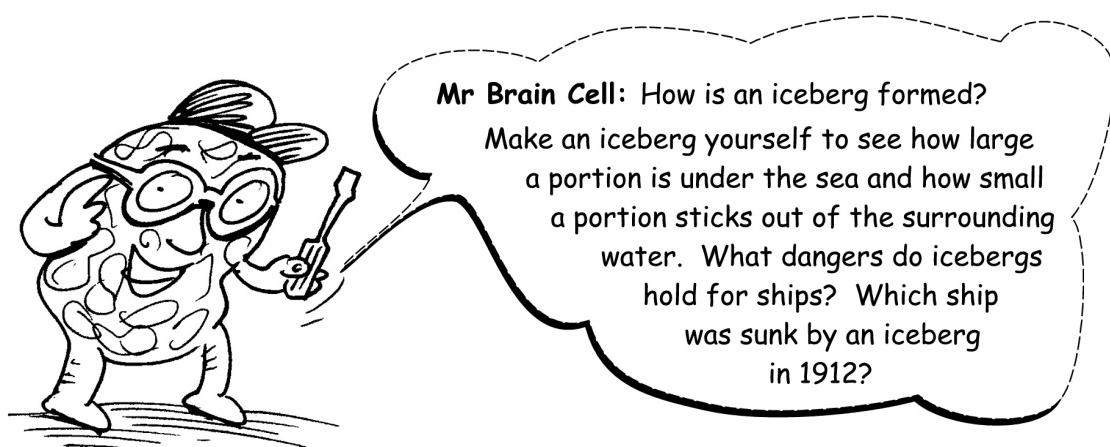


Figure 3.61

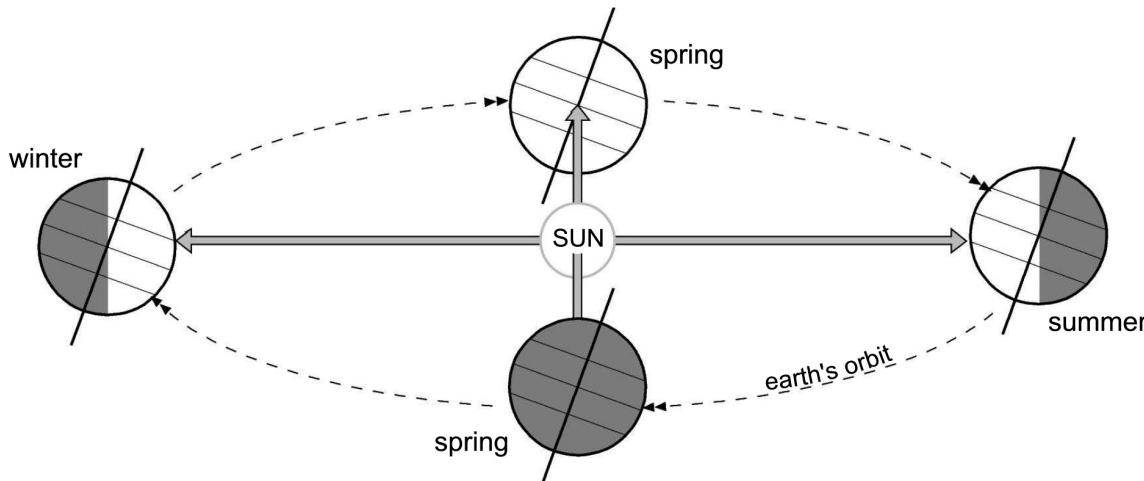


Figure 3.62

- As the earth orbits the sun, the weather changes according to seasonal patterns. During the warm summer months more solar energy reaches the earth than in the cold winter months. The nearer you live to the Polar Regions, the more noticeable the changes are. Many animals and plants are affected quite drastically by the seasons and adapt their lives to the seasonal changes.

3.13.5.5 Autumn

- During autumn many animals prepare for winter when it will be very difficult for many of them to find food. They collect food and store it in safe places. Some birds migrate to warmer parts of the world.
- Some trees lose their leaves in autumn.

3.13.5.6 Winter

- The fur of most animals becomes thicker to enable them to cope better with the winter cold. They only need a few things to survive the winter: food, shelter and water. Just before the worst cold of winter, some animals eat lots of food and then sleep to conserve energy. We talk about them hibernating. You can help birds in your garden to survive by putting out food for them.
- Trees that lose their leaves protect the new leaves for the coming year within their buds.

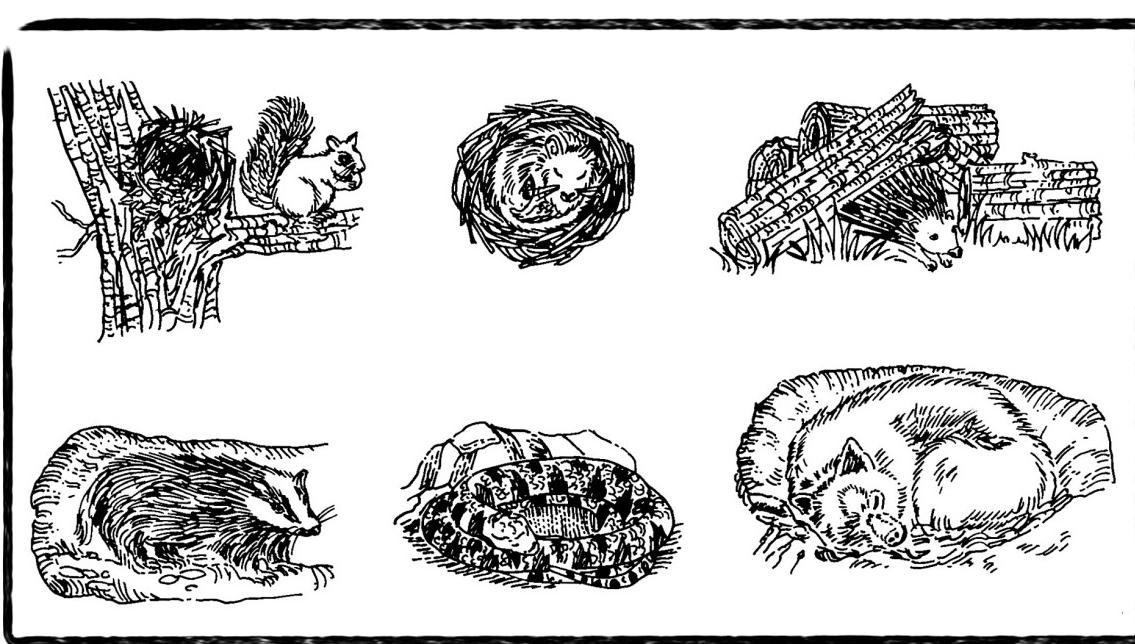


Figure 3.63

3.13.5.7 Spring

- Buds and blossoms appear everywhere when it is time for new leaves and flowers. Animals once again become active and prepare their shelters for their young. Animals that have hibernated wake up. The warmth of the spring and spring rains allow the grasses to grow for the animals to eat.
- Birds that migrated return and prepare nests to lay their eggs. By the time that the eggs hatch in late spring there will be sufficient insects for them to eat.

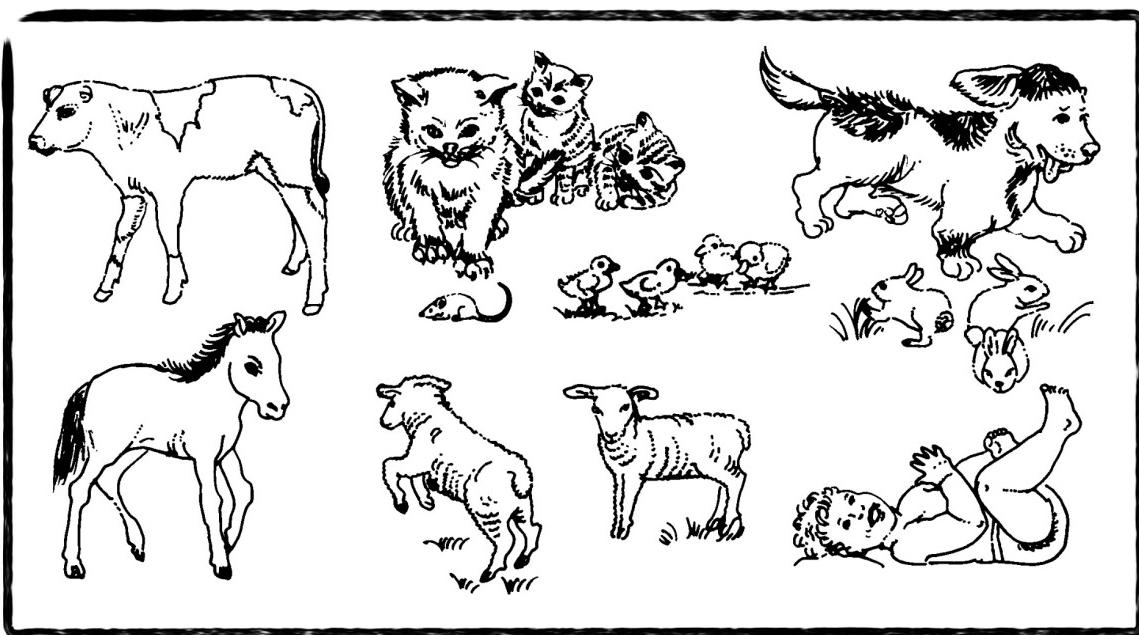


Figure 3.64

3.13.5.8 Summer

- Plants grow quickly because there is sufficient sunlight. Animals shelter in the shade when it becomes too hot. Many animals now give birth to young that need care. Animals look for water to help keep cool.

Organise an exhibition around each season in your class. Bring things to school that relate to specific seasons.

3.13.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONSThe learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

1.3 evaluates data and provides feedback on observations.

3.13.7 Memorandum

Mr Brain Cell:

- Why is it so cold at the poles? Answer
- When the sun shines on the equator, all the rays are close together and therefore it is hot there. Since the earth is ball-shaped, the rays are spread over larger areas closer to the north and south poles. The rays are weaker, and therefore it is cold at the poles.

Mr Brain Cell:

- How is an iceberg formed?
- Make one for yourself so you can see the large section of ice that stays submerged, and the section that is above water. What danger does this hold for ships? Which ship sank as a result of hitting an ice-berg in 1912? Answer:
- Fill a plastic bag with water and freeze it. Remove the ice from the bag and put it in a bowl of water. See how large the part is that stays under water!
- Large pieces of ice break from icecaps and glaciers and float on the sea. As they drift to warmer seas, they start to melt and break up. However, some icebergs can take up to three years to melt.
- Titanic

Chapter 4

Term 4

4.1 Matter¹

4.1.1 NATURAL SCIENCES

4.1.2 Grade 4

4.1.3 MATTER, SUBSTANCES AND MATERIALS

4.1.4 Module 50

4.1.5 MATTER

4.1.6 Activity:

4.1.7 To discover the properties and experience the wonder of matter

4.1.8 [LO 1.1.2, 2.2.1]

4.1.8.1 Let's play the game:

4.1.9 I spy with my little eye.

and then describe the thing that you see by answering the following:

How does it feel? (hard, soft, etc.)

Can one eat or drink it?

Can one play with it?

The one who guesses the answer correctly gets a point. If after five guesses your partners cannot guess what it is, you get a point.

4.1.9.1 What is matter?

Everything you can touch is **matter**.

Matter has mass

¹This content is available online at <<http://cnx.org/content/m20137/1.1/>>.



Figure 4.1

Try the following (1):

Pick up your ruler. What does it feel like?

Pick up your partner. How does that feel? Which one was more difficult to pick up?



Figure 4.2

My finding is that:

4.1.9.2 Matter occupies space

Try the following:

Take a glass of water.

Put flowers in the water. What happens to the water?

Why do you think it happened?

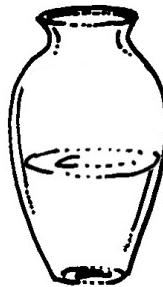


Figure 4.3

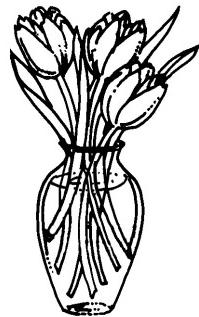


Figure 4.4

My finding is that:

From old newspapers cut out all the pictures on the first ten pages. The pictures should be of living and non-living matter. Make two piles of pictures, one for living matter and one for non-living matter. First list the properties of living matter before you begin cutting out.

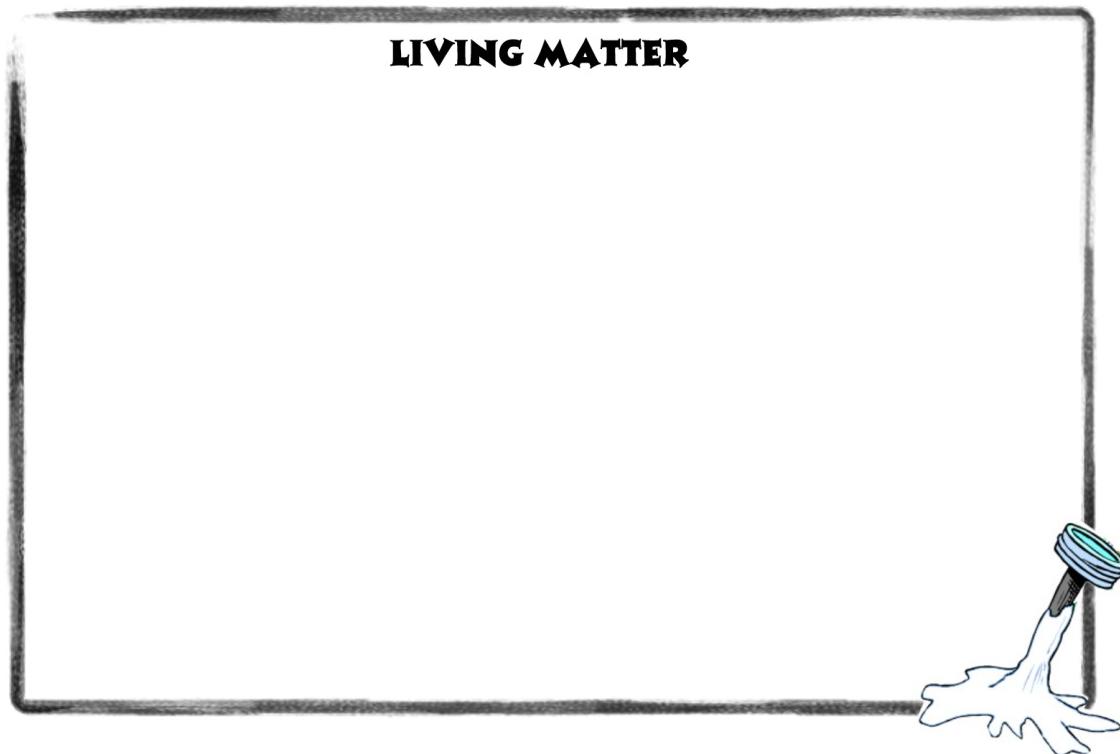


Figure 4.5

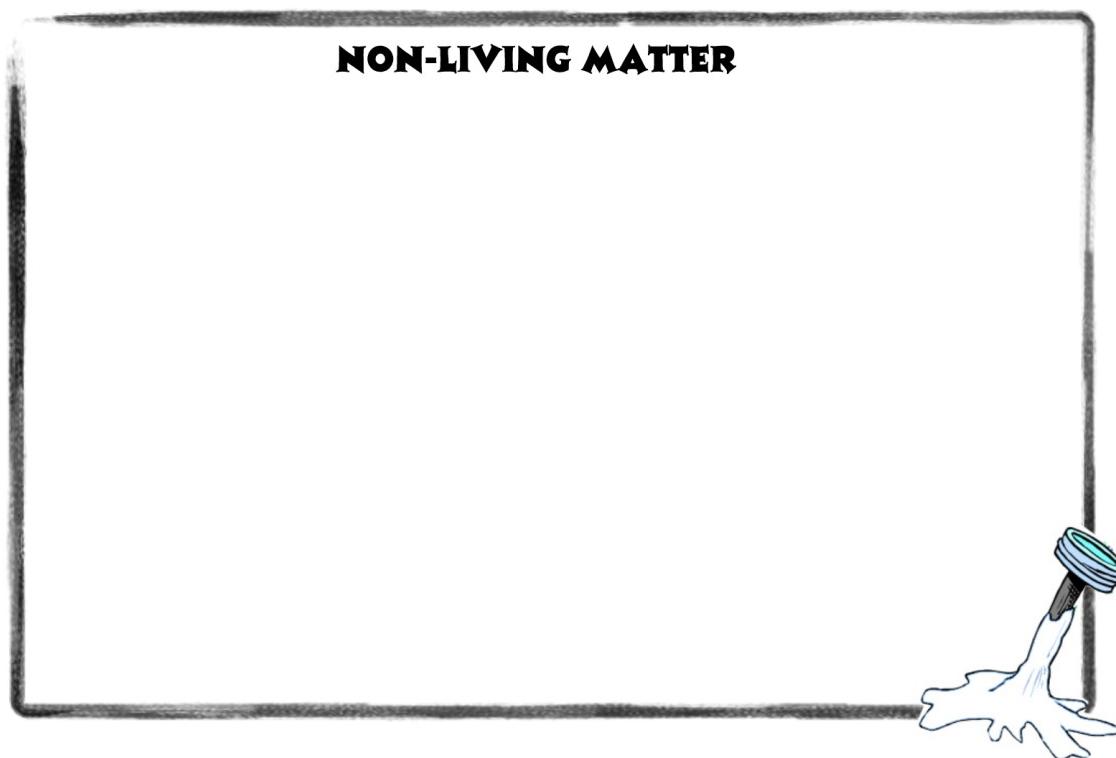


Figure 4.6

4.1.10 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONS

The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

- plans investigations:

1.1.2 talks about personal experiences, highlighting aspects which relate to science or technology.

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGE The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner

categorises information: sorts objects and organisms by a visible property:

- follows instructions to sort animals in groups of those with two legs, with four legs, and with more than four legs.

4.1.11 Memorandum

Try the following (1)

- Pick up your ruler. What does it feel like? Pick up your partner. Which one was more difficult to pick up?
- Answer:
- The ruler is lighter than the partner but both have mass.

Try the following (2)

- Take a vase containing water. Put in a bunch of flowers. What happens to the water? Why does this happen?
- Answer:
- The water rises in the vase. The flower and the water are both matter. Both occupy space.

PROPERTIES OF LIVING MATTER

List the properties that living matter must have before you begin cutting out.

1. Movement: It must be able to move.
2. Respiration: It must be able to breathe.
3. Procreation: It must be able to breed.
4. Ingest food: It must be able to consume food.
5. Excretion: It must be able to excrete undesirable substances such as sweat.

4.2 Using material to design and make things²

4.2.1 NATURAL SCIENCES

4.2.2 Grade 4

4.2.3 MATTER, SUBSTANCES AND MATERIALS

4.2.4 Module 51

4.2.5 USING MATERIAL TO DESIGN AND MAKE THINGS

4.2.5.1 Activity:

4.2.5.2 To investigate how we can use material to design and make wonderful things

4.2.5.3 [LO 1.1.1]

Have a good look at the pictures in the frames and complete the labels.

²This content is available online at <<http://cnx.org/content/m20138/1.1/>>.



Figure 4.7

4.2.5.4 Matter Use Drawing of the use Task

Cut out three pictures of different advertised products. Discuss in your groups what materials were possibly used to make these products.

Put all the pictures together, grouping them according to the material they have been made of.

4.2.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONS

The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

plans investigations:

- suggests actions to try with the materials.

4.2.7 Memorandum

Learners can use either the pictures in the block, their own or a combination of both advertisements

- Collect advertisements regularly, watch magazines, newspapers and junk mail. Have the learners bring these to school.

4.3 The states in which matter occurs³

4.3.1 NATURAL SCIENCES

4.3.2 Grade 4

4.3.3 MATTER, SUBSTANCES AND MATERIALS

4.3.4 Module 52

4.3.5 The states in which matter occurs

4.3.5.1 Activity:

4.3.5.2 To discuss the three states in which matter occurs

4.3.5.3 [LO 1.2.2, 1.2.3, 1.3.1]

4.3.5.3.1 Task

See if you can unscramble the following groups of letters to make the names of the three states of matter.

1. o i l d s
2. d q l u i i
3. s a g

Let's look at the properties of each state. Which state are we speaking of when we say:

It has its own shape, has mass and occupies space.

It does not have its own shape but can be seen and occupies space.

It does not have its own shape and can't be seen.

³This content is available online at <<http://cnx.org/content/m20140/1.1/>>.

4.3.5.4 Matter can change its shape

What substance can change into all three states of matter?

Try the following (3) :

Make interesting ice cubes in the freezer. Put leaves or flowers in each container with the water. Wait until the water has frozen.

The water has now become hard. What do we call it?

We call it Draw it.

Take the ice cubes out of the containers and put four in a pot on the stove. Put another four in a different pot. Do not put them on the stove. Now turn on the stove. What happens to the ice cubes on the stove?

The ice cubes have changed into a different state. What do we call them now?

We call it Draw it.

What happens to the ice cubes that weren't on the stove? Why did the ones on the stove melt quicker?

Now let the water in the pot on the stove boil.

What happens to the water now? What do we call it?

We call it Draw it.

What is the temperature when water boils?

What is the temperature when water freezes?

Try the following (4):

Take four ice cubes. Place one in the fridge, one on a table, one next to a burning candle and one in a glass container. Each half-hour observe what has happened to the ice cubes. Draw a graph on the board to show the different tempos at which the ice cubes melt.

What is your conclusion?

4.3.5.5 My conclusion is:

Let's have some fun. Divide the class into three groups. One group is the solids, another the liquids and the third is the gases. Each group makes a play to show its properties. Use music, discarded items, strange costumes and loads of creativity.

Some changes in matter are temporary, others are permanent

4.3.5.6 Try the following (5):

Bring ten different containers that can hold water to school. Take one glass of water and in turn pour it into each container. Notice how the water changes form.

Now discuss how the following change:

- snow on the mountains;
- puddles on the playground;
- washing;
- steam in a shower;
- ice cubes.

4.3.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONS

The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner

- conducts investigations and collects data:

- tries own idea of how the materials might respond;
- perseveres or repeats the activity in different ways, experiencing the phenomenon in other ways.
- evaluates data and communicates findings:

1.3.1 describes own perceptions of the event, relating to the purpose of the investigation.

4.3.7 Memorandum

Three forms in which matter occurs

- Task: See if you can sort out the numbered letters to identify three forms of matter:

1. l o s I d : solid
2. d I l I q u : liquid

3. s a g: gas

Let's look at the properties of each state.

Which one are we talking about now?

- Own shape, has mass, visible, occupies space: solid
- Doesn't have own shape, visible, occupies space: liquid
- Doesn't have own shape, invisible: gas

Matter can change shape

Try the following (3)

- What substance can be in all three states? Draw each one in its block and make a caption for each one. Answer:
- Water can be in all three states. Learners draw a glass of water with the caption: Liquid. Draw an ice cube with the caption: Solid. Draw a kettle boiling with steam with the caption: Gas.

Mr Brain Cell:

- What is the temperature of boiling water?
- What is the temperature at which water freezes? Answer:
- 100 degrees Celsius
- 0 degrees Celsius

Try the following (4)

- Conclusion: The one close to the burning candle melts the quickest, the one in the fridge melts the slowest. Heat melts ice quickly, cold allows it to melt slowly.

Try the following (5)

- Let learners do the experiment themselves.
- Changes:
- Snow on the mountains: The solid changes to a liquid.
- Puddles on the mountain: Liquid changes to gas
- Washing: Liquid changes to gas
- Condensation in the shower. Gas changes to liquid.
- Ice cube: Solid changes to a liquid.

4.4 The use of materials in our houses⁴

4.4.1 NATURAL SCIENCES

4.4.2 Grade 4

4.4.3 MATTER, SUBSTANCES AND MATERIALS

4.4.4 Module 53

4.4.5 THE USE OF MATERIALS IN OUR HOUSES

4.4.5.1 Activity:

4.4.5.2 To discuss the use of materials in our houses, especially plastics

4.4.5.3 [LO 1.1.1]

4.4.5.3.1 plastic

Think of any use for a plastic bag. Don't just think of normal, everyday uses. Be creative and think of unusual uses. How many uses could your group find? Report to the class.

Try the following :

Take a yoghurt container, a rubber band and some of the following materials: grease-proof paper, cardboard, wool, cotton cloth, tin foil, cling wrap and a paper serviette. In turn fix each one over the open end of the container with the rubber band. Drip a teaspoon of water onto each piece of material and see what happens. Does the water filter through?

Which material was the best at keeping water out of the container?

Try the following :

Let's make a parachute. Make parachutes from each of the following materials: newspaper; plastic bag; cotton handkerchief; cardboard; tissue; writing paper. Drop each parachute from the same height. Which material made the best parachute?

adNot at all2. Plastic bag.GoodNot badNot at all3. Cotton handkerchief.GoodNot badNot at all4. Cardboard.GoodNot badNot at all5. Tissue.GoodNot badNot at all7. Writing paper.GoodNot badNot at all



Figure 4.8

Plastic is used for many items in the home, as it is cheap but durable. It is also more easily disposed of than, for example, glass. Think of a picnic. One takes a heavy hamper full of cold drink bottles. It's nice to be able to throw away the empty bottles (in a rubbish bin, of course!) at the end of the picnic and not to carry them home again.

Write the names of the members of your family one beneath the other. Make a list of the plastic items that they use every day next to each one's name. Who uses the most plastic items in the home each day?

⁴This content is available online at <<http://cnx.org/content/m20142/1.1/>>.

Unfortunately it takes a long time for plastic to decompose. The government has banned all free plastic bags in shops. Customers now have to take their own shopping bags when they go shopping.

Hold a debate to discuss this.

Design a new shopping bag to solve the problems that have been discussed.

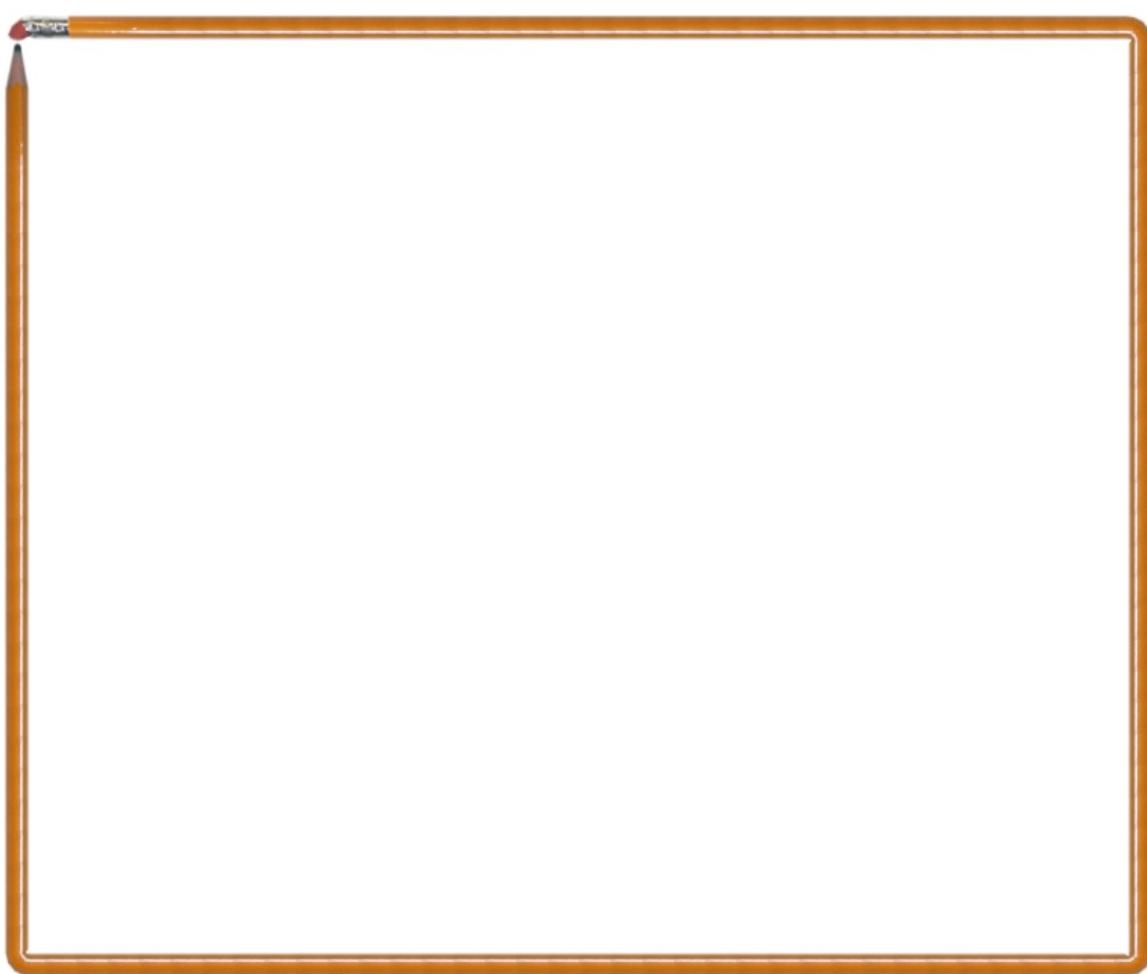


Figure 4.9

M y own design

Paste all the types of plastic that you can find in your kitchen in the spaces below.

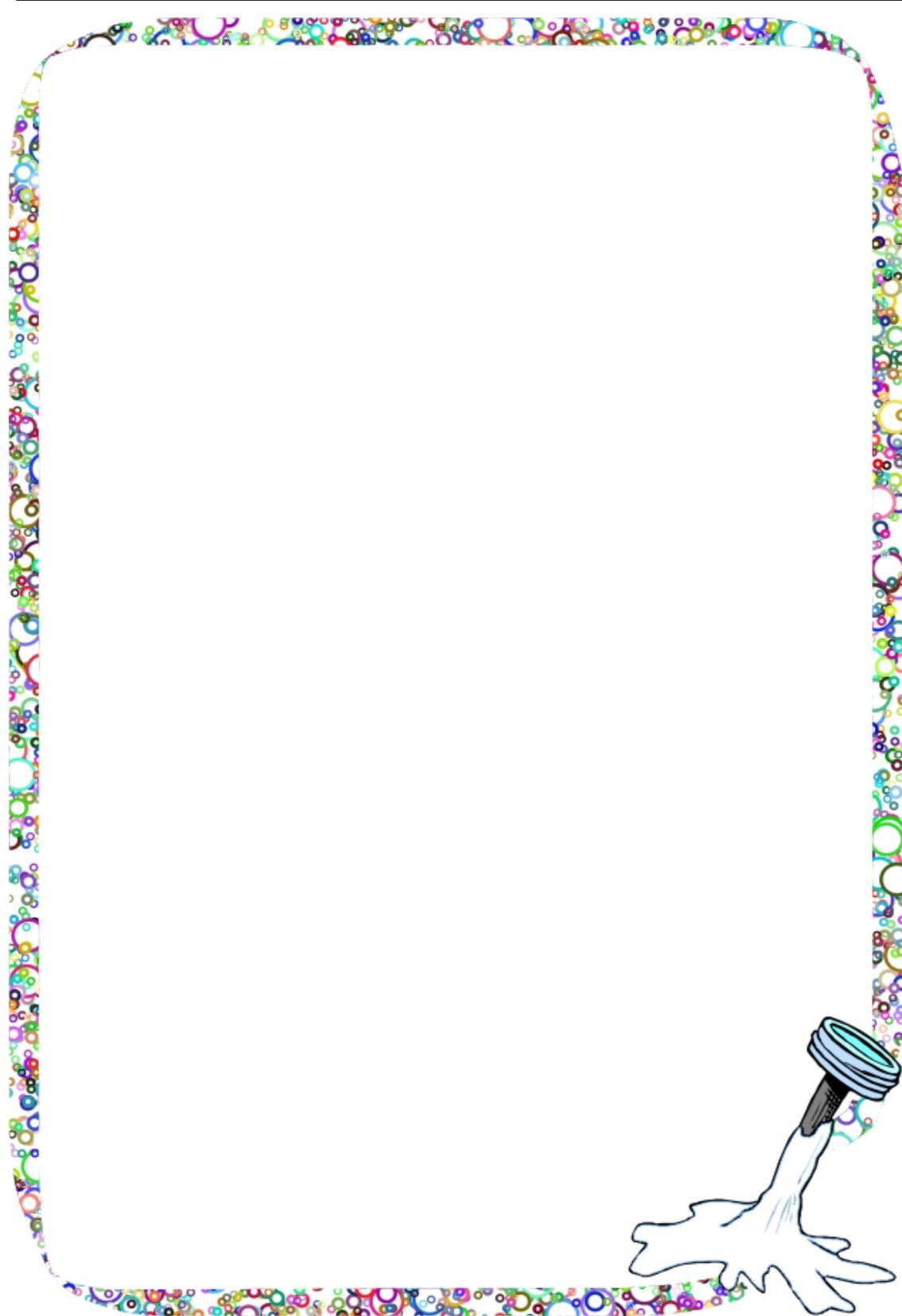


Figure 4.10

Until recently plastic bags were a big problem in our beautiful country because they littered the countryside. Think of all the places where these bags could be seen and think of all the things that they could have been used for.

You pick up a plastic bag in the street. It is dirty, torn and full of rubbish. The bag's name is Baggie. Draw a comic strip about the life of Baggie – a life full of danger, with many experiences, but still a useful life in which he served a good purpose.

4.4.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONS

The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner
plans investigations:

- suggests actions to try with the materials.

4.4.7 Memorandum

Try the following (6)

- Have learners do the experiment themselves.

Try the following (7)

- Have learners do the experiment themselves.

4.5 Fibres and fabrics⁵

4.5.1 NATURAL SCIENCES

4.5.2 Grade 4

4.5.3 MATTER, SUBSTANCES AND MATERIALS

4.5.4 Module 54

4.5.5 FIBRES AND PLASTICS

4.5.5.1 Activity:

4.5.5.2 To investigate the use of materials, especially fibres and fabrics [LO 1.2.1]

There are different kinds of fibres: those made by man and natural ones made from plants or animals.

What do we call people who design clothes?

The designer has to decide what the use of an article is before they design it. For example, if it is designed for fire fighters it must be made of fire resistant material. If it is to keep people warm it must be of material that insulates well.

Try to obtain small pieces of the following fabrics and paste them in the blocks below. Say where each type of fabric might be used.

⁵This content is available online at <<http://cnx.org/content/m20144/1.1/>>.

Lace:

Denim:

Cotton:

Wool:

Plastic:

Straw:

Velvet:

Rubber:

Lycra:

Be creative and design a special hat for a man who:

1. is doing excavations in a desert;
2. is studying snakes in a steamy jungle;
1. is working underground in a mine;
2. is playing the role of a rabbit in a concert.

For each picture say what type of material you will use.

4.5.6 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONS

The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standard

We know this when the learner
conducts investigations and collects data:

- notes and remarks on obvious changes or interesting details.

4.5.7 Memorandum

Mr Brain Cell:

4.5.7.1 People who design clothes are fashion designers.

- Small pieces of material.
- Let learners decide for themselves or in groups where these materials will be used.

Hat: Draw a design in each block

4.6 Planning to build a house⁶

4.6.1 NATURAL SCIENCES

4.6.2 Grade 4

4.6.3 MATTER, SUBSTANCES AND MATERIALS

4.6.4 Module 55

4.6.5 PLANNING TO BUILD A HOUSE

4.6.5.1 Activity:

4.6.5.2 To think about how to build a house

4.6.5.3 [LO 1.1.1, 1.2.2, 3.2]

4.6.6 TO BUILD A HOUSE

Let's tell the story of the three pigs. Draw the story in the form of a comic strip. How many learners are there in your class? Draw the same number of blocks on a big sheet of cardboard. Measure the size of these blocks and give each learner an A4 sheet with a block of the same size to draw one of the comic panels. This project will take careful planning.

What do we call someone who designs houses and office buildings?

The straw and the sticks of the first two pigs did not work very well but the brick house of the third pig did. What conclusion can we draw from this?

4.6.6.1 Let's be creative

Work together in groups of three. Decide what kind of house you want to design, draw and build. Decide if it will be a formal or an informal structure. Use any kind of waste material. If you want to carry the experiment further then you could put the house outside for a week, or have a fan blow onto it for a day. See which structure lasts the longest in all weather conditions.

1. Draw the house from above as in the drawing below. Use A4 paper.

⁶This content is available online at <<http://cnx.org/content/m20148/1.1/>>.

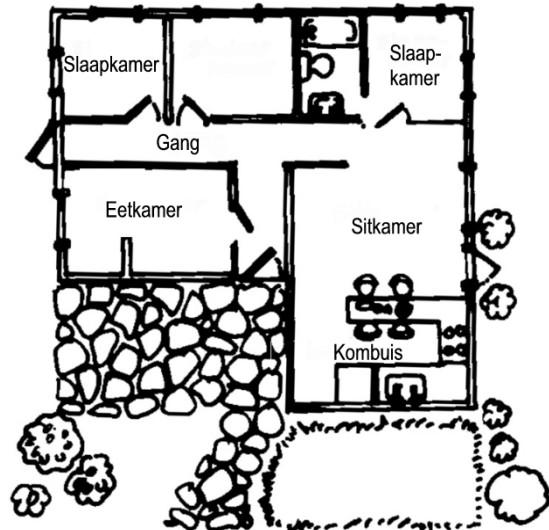


Figure 4.11

-
2. Write down which rooms you will have in your house.
 3. Design the furniture you will have in your house. Use the pictures as an example. Work in groups. Each group chooses a room and makes the furniture for that room from matchboxes or similar small boxes.

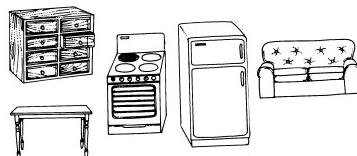


Figure 4.12

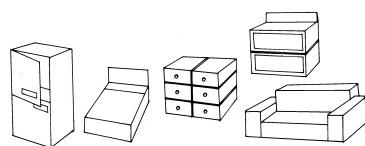


Figure 4.13

**Figure 4.14**

4. Write down the kinds of houses that the learners in your class live in. Have each learner colour in the house that he or she lives in. Now you can see which type of house most members of the class live in, for example, house, town house, flat, etc.

**Figure 4.15**

4.6.7

4.6.8 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATION The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific,

technological and environmental contexts.

4.6.8.1 Assessment Standard

We know this when the learner
plans investigations:

- suggests actions to try with the materials;
- conducts investigations and collects data;

- tries own idea of how the materials might respond.

LEARNING OUTCOME 3:SCIENCE, SOCIETY AND THE ENVIRONMENTThe learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

4.6.8.2 Assessment Standard

We know this when the learner

- understands the impact of science and technology: identifies features of technological devices around him or her, and tells about their purpose and usefulness;

4.6.9 Memorandum

To build houses:

- What do we call someone who designs houses, buildings and offices? Answer:
● Architect
1. Use A4 paper to design a house. There are computer programmes that could help with this. If the school has the facilities please let the learners use them.
 2. They decide themselves which rooms are important and which not. If they have left out something e.g. the toilet, provide advice.
 3. Hold an exhibition of all the furniture that they have made.
4. Follow the instructions.

4.7 The value of building material⁷

4.7.1 NATURAL SCIENCES

4.7.2 Grade 4

4.7.3 MATTER, SUBSTANCES AND MATERIALS

4.7.4 Module 56

4.7.5 THE VALUE OF BUILDING MATERIAL AS A RESOURCE

4.7.5.1 Activity:

4.7.5.2 To appreciate the value of materials as a resource in the building of houses

4.7.5.3 [LO 1.2.1, 2.2.1, 3.2]

4.7.6 Building Materials

When a house is built the materials used are either natural or are manufactured. Here is a picture of a house. Colour in the natural materials yellow and the manufactured materials red.

Figure 4.16

⁷This content is available online at <<http://cnx.org/content/m20149/1.1/>>.

4.7.6.1 Wood

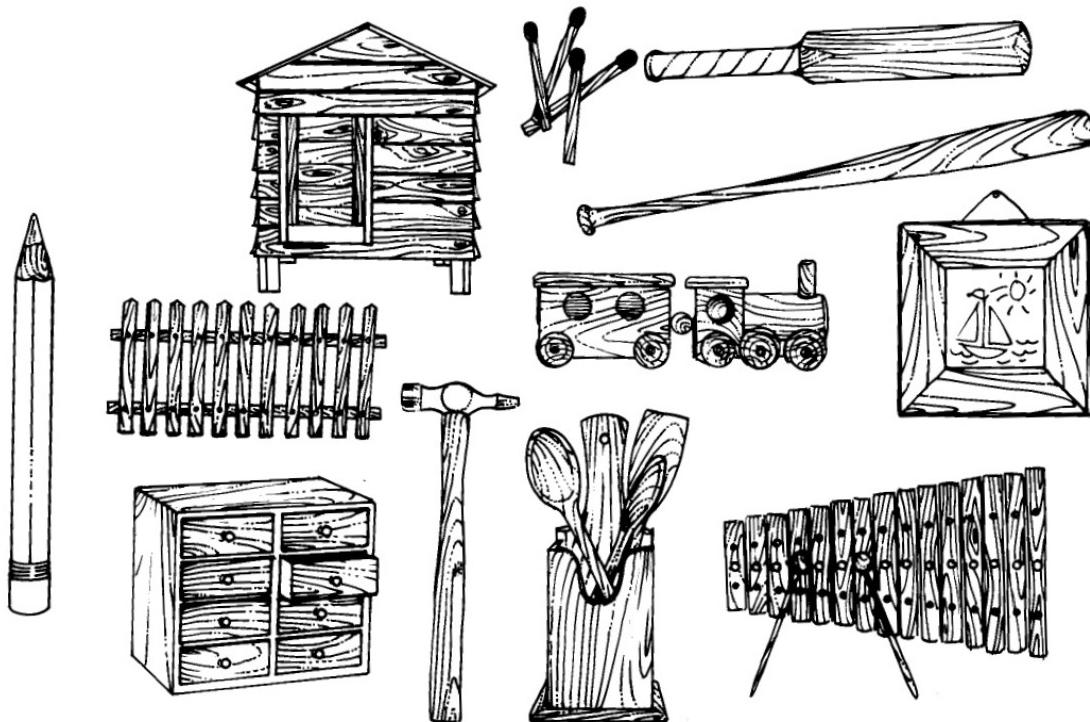


Figure 4.17

One of the natural products that are used to build the house is wood.

Wood is a wonderful resource. Divide the class into six groups. Give three minutes to list everything that is made of wood in:

the classroom

your room at home

the sitting room in your house

the kitchen

on the school grounds

in the school hall

1. What conclusion can you draw from this?

My conclusion is

2. Write to SAPPI to ask for posters for your class.

Bricks



Figure 4.18

When a house is built most builders use bricks. Complete the following sentences by using the following words .

bulldozers, clay, straw, cheap, difficult, kiln, 10 000, India, bricks, machines, baked, wire, heavy, strong, easy, sun, harder, rots, mud, length

When a house is built builders must make a choice of what they will use to build with.

Stone is , expensive and to work with and wood if one does not maintain it. But bricks can be made from or which are easily obtainable. It is usually fairly and to make bricks. Bricks are easy to work with and make walls.

About years ago the first bricks were made in the Middle East. They were made of mud baked in the sun. The brick makers soon discovered that if bricks were in a fire they became

In countries like Malawi and mud bricks are still used. The mud is mixed with and then pressed together and left in the to dry.

At brick-kilns in our country so much clay is used that are need to move the clay. The clay is mixed in and is pressed into long tubes. cutters are used to cut the tubes to the right

The bricks are dried and then fired in a Modern kilns can make up to 80 000 a day.

4.7.6.2 To write with

Thousands of years ago people used all sorts of ways to write. They used materials from animals, stone, plants and clay. They wrote and drew on papyrus, bark, animal skins and stone.

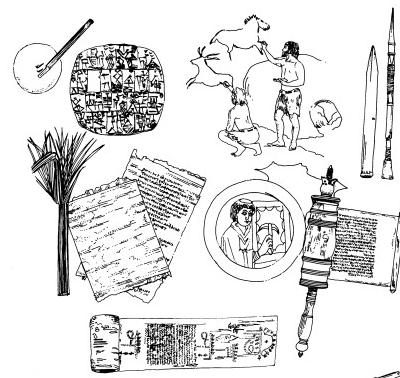


Figure 4.19

Today it is much easier. We simply go to the shops and buy the most wonderful writing utensils. All of these are made of different kinds of matter.



Figure 4.20

Think of someone from the past who has fascinated you. Send a short SMS message to him or her to show how the technology of writing has changed over the years.

Write the message on the cell phone.

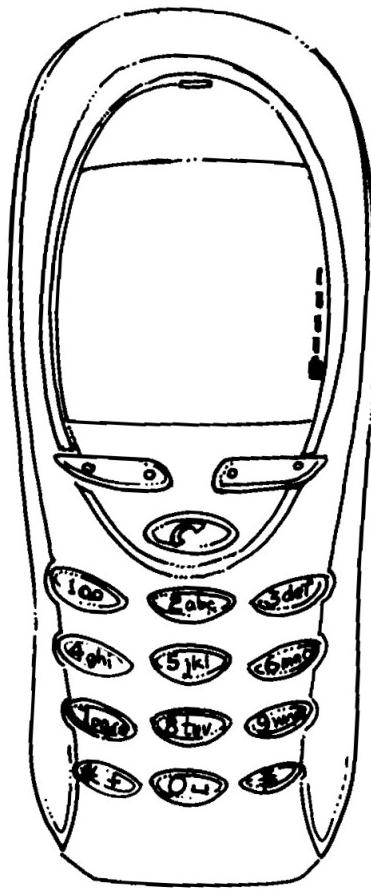


Figure 4.21

4.7.7 Assessment

LEARNING OUTCOME 1: SCIENTIFIC INVESTIGATIONSThe learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

4.7.7.1 Assessment Standard

We know this when the learner
conducts investigations and collects data:

- notes and remarks on obvious changes or interesting details.

LEARNING OUTCOME 2: CONSTRUCTING SCIENCE KNOWLEDGEThe learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

We know this when the learner

- categorises information: sorts objects and organisms by a visible property.

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

4.7.7.2 Assessment Standard

We know this when the learner

- understands the impact of science and technology: identifies features of technological devices around him or her, and tells about their purpose and usefulness.

4.7.8 Memorandum

Building materials

- Natural materials: colour in yellow.
- Other materials: colour in red.

Bricks: Cloze Technique

- Heavy,
- difficult,
- rotten,
- mud,
- clay,
- cheap,
- strong,
- 10 000, baked, harder
- India, straw, sun
- Bulldozers, machine, wire, lengths
- Kiln, bricks

To write with:

- Children do not know the old ways of writing. If there is time read old-fashioned articles or stories and watch suitable videos.
- You all know SMS messages well.

4.8 The dangers of pollution⁸

4.8.1 NATURAL SCIENCES

4.8.2 Grade 4

4.8.3 MATTER, SUBSTANCES AND MATERIALS

4.8.4 Module 57

4.8.5 THE DANGERS OF POLLUTION

4.8.5.1 Activity:

4.8.5.2 To discuss the dangers of pollution and to try to make a difference

4.8.5.3 [LO 3.1.2, 3.2.1]

Unfortunately materials can cause pollution. We all know how important it is to preserve our environment and to prevent pollution as far as possible.

Let's walk around the school grounds. Look around well and write down your findings.

Write down four things that you see on the school grounds.

Write down four things you saw which upset you or which could have a negative effect on our environment.

Choose one of the negative things and write a letter to the principal to make a suggestion on how the problem can be solved.

Dear

Have the teacher or a member of the student council make an announcement about the problem and make an appeal to learners to do something about it.

Role-play: You are a television reporter. Report on the condition of the school grounds just after break.

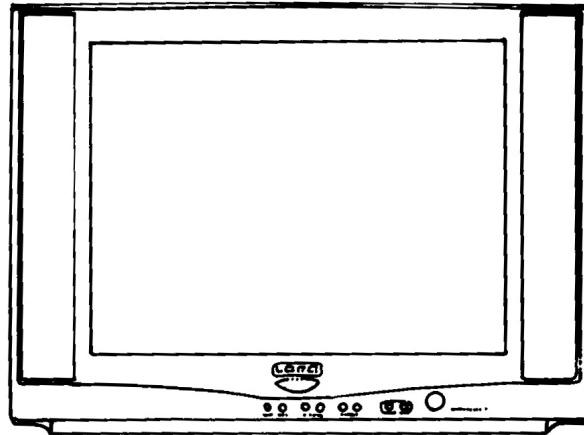


Figure 4.22

⁸This content is available online at <<http://cnx.org/content/m20151/1.1/>>.

Discuss ways of preventing pollution. Make a poster and stick it to the wall at the front of the class. Discuss the use of rubbish removal by the municipality. Find out how rubbish was disposed of in the past and how standards of hygiene have improved over the years.

Let's use waste material to make

4.8.6 Litterbug

1. Get a large box and cover it with paper or cardboard that is going to be thrown away.
 2. Make a head on a smaller box and stick it onto the bigger box.
 3. Make a nose, eyes and mouth from waste material.
 4. Make arms, legs and feet.
 5. Keep him in a cupboard and collect recyclable material in him.
-



Figure 4.23

Make small stickers with ideas of how to combat pollution and hang them from a fishing line across the class. Use paper clips to hang them up.

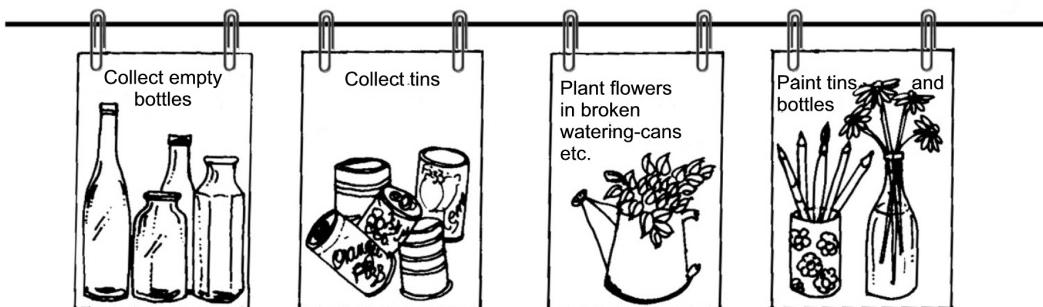


Figure 4.24

4.8.7 Assessment

LEARNING OUTCOME 3: SCIENCE, SOCIETY AND THE ENVIRONMENT The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society

and the environment.

4.8.7.1 Assessment Standard

We know this when the learner

3.1 understands science and technology in the context of history and personal knowledge:

- describes methods of sending messages over short and long distances.
- understands the impact of science and technology: identifies features of technological devices around him or her, and tells about their purpose and usefulness;
- suggests why having running water in a home might make people's lives easier.

4.8.8 Memorandum

Pollution is a serious problem. If the youth understand this and do something about it then the problem can be controlled. Emphasise this frequently – it will keep the classroom, terrain and town tidier.

Litterlout

Make it a class activity. The children should enjoy it very much.

Attributions

Collection: *Natural Sciences Grade 4*

Edited by: Siyavula Uploaders

URL: <http://cnx.org/content/col11096/1.1/>

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The senses"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m21193/1.1/>

Pages: 1-4

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Natural Science module 2"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19912/1.1/>

Pages: 4-5

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The story of Louis Braille"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19913/1.1/>

Pages: 5-7

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The sense of hearing"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19914/1.1/>

Pages: 7-10

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The sense of smelling and taste"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19915/1.1/>

Pages: 10-12

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The sense of touch"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19916/1.1/>

Pages: 12-13

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Plants and animals"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19917/1.1/>

Pages: 13-21

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "A simple food chain"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19918/1.1/>

Pages: 21-22

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Compare the growth of plants"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19919/1.1/>

Pages: 22-23

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Plant habitats"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19920/1.1/>

Pages: 23-25

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Usefulness of plants"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20222/1.1/>

Pages: 26-27

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Rooibos Tea"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19921/1.1/>

Pages: 27-30

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Potatoes"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19923/1.1/>

Pages: 31-32

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Maize"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19924/1.1/>

Pages: 33-35

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Other useful plants"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20225/1.1/>

Page: 36

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "A balanced diet"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19925/1.1/>

Pages: 37-39

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The digestive system"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19926/1.1/>

Pages: 39-40

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Water"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19927/1.1/>

Pages: 41-45

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The water cycle"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19929/1.1/>

Pages: 45-46

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The personal use of water"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19931/1.1/>

Page: 47

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Water and its uses"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20229/1.1/>

Pages: 48-50

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Conservation of water"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19932/1.1/>

Pages: 50-54

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Supply clean water to households"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19933/1.1/>

Pages: 54-57

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "When water is dangerous"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m19946/1.1/>

Pages: 57-62

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Menaing of the word ENERGY"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20097/1.1/>

Pages: 63-65

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The sun as a source of energy"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20099/1.1/>

Pages: 66-72

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The dangers of sunburn"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20101/1.1/>

Pages: 72-75

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Making energy available to people"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20103/1.1/>

Pages: 75-80

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Wind as a source of energy"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20104/1.1/>

Pages: 80-85

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Fire as a source of energy"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20106/1.1/>

Pages: 85-92

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Food as a source of energy"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20107/1.1/>

Pages: 92-95

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Man's use of electricity"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20108/1.1/>

Pages: 95-99

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Saving electricity"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20109/1.1/>

Pages: 100-104

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Making a simple electric switch"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20112/1.1/>

Pages: 105-106

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Dangerous ways of using electricity"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20113/1.1/>

Pages: 107-111

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Problems with electrical appliances"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20114/1.1/>

Page: 111

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Investigating the mysteries of outer space"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20189/1.1/>

Pages: 113-116

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Talking about satellites"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20116/1.1/>

Pages: 117-119

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Sunrise and sunset"
By: Siyavula Uploaders
URL: <http://cnx.org/content/m20214/1.1/>
Pages: 119-121
Copyright: Siyavula Uploaders
License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The earth and its movement"
By: Siyavula Uploaders
URL: <http://cnx.org/content/m20117/1.1/>
Pages: 121-124
Copyright: Siyavula Uploaders
License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The stars and planets"
By: Siyavula Uploaders
URL: <http://cnx.org/content/m20200/1.1/>
Pages: 125-127
Copyright: Siyavula Uploaders
License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The moon and its function"
By: Siyavula Uploaders
URL: <http://cnx.org/content/m20217/1.1/>
Pages: 127-132
Copyright: Siyavula Uploaders
License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Talking about the weather"
By: Siyavula Uploaders
URL: <http://cnx.org/content/m20120/1.1/>
Pages: 132-135
Copyright: Siyavula Uploaders
License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Weather forecasting"
By: Siyavula Uploaders
URL: <http://cnx.org/content/m20210/1.1/>
Pages: 136-142
Copyright: Siyavula Uploaders
License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Stormy weather"
By: Siyavula Uploaders
URL: <http://cnx.org/content/m20121/1.1/>
Pages: 142-146
Copyright: Siyavula Uploaders
License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Describing the seasons"
By: Siyavula Uploaders
URL: <http://cnx.org/content/m20123/1.1/>
Pages: 147-153
Copyright: Siyavula Uploaders
License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Talking about the oceans"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20134/1.1/>

Pages: 153-155

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Life at the north and south poles"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20130/1.1/>

Pages: 156-159

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The seasons in the polar regions"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20133/1.1/>

Pages: 160-165

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Matter"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20137/1.1/>

Pages: 167-172

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Using material to design and make things"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20138/1.1/>

Pages: 172-174

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The states in which matter occurs"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20140/1.1/>

Pages: 174-176

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The use of materials in our houses"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20142/1.1/>

Pages: 177-180

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Fibres and fabrics"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20144/1.1/>

Pages: 180-181

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "Planning to build a house"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20148/1.1/>

Pages: 182-185

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The value of building material"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20149/1.1/>

Pages: 186-191

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

Module: "The dangers of pollution"

By: Siyavula Uploaders

URL: <http://cnx.org/content/m20151/1.1/>

Pages: 192-194

Copyright: Siyavula Uploaders

License: <http://creativecommons.org/licenses/by/3.0/>

About Connexions

Since 1999, Connexions has been pioneering a global system where anyone can create course materials and make them fully accessible and easily reusable free of charge. We are a Web-based authoring, teaching and learning environment open to anyone interested in education, including students, teachers, professors and lifelong learners. We connect ideas and facilitate educational communities.

Connexions's modular, interactive courses are in use worldwide by universities, community colleges, K-12 schools, distance learners, and lifelong learners. Connexions materials are in many languages, including English, Spanish, Chinese, Japanese, Italian, Vietnamese, French, Portuguese, and Thai. Connexions is part of an exciting new information distribution system that allows for **Print on Demand Books**. Connexions has partnered with innovative on-demand publisher QOOP to accelerate the delivery of printed course materials and textbooks into classrooms worldwide at lower prices than traditional academic publishers.